COAL AGE

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Sympathy for the Railroads

NO fair minded coal man will raise a voice against the plea of the railroads for a substantial increase in rates. Only recently the coal industry went before the tribunal of the government, the Bituminous Coal Commission, asking for relief from oppressively low prices. The remembrance of those times and the spectacle of the railroads with hands tied make the coal industry halt before it sanctions any move on the part of Congress that may lead to putting their business in the same kind of harness. Senator Frelinghuysen's Coal Commissioner bill is harmless in this respect and it has many excellent provisions, but it is meeting with objection because it is seen as an opening wedge for permanent government control of the coal business.

Fair Prices for All

THIS coal industry of ours has never faced a more critical situation than that which confronts our business today. A coal operator from Chicago writes us further along this line and so well does he put it that we quote his letter. He adds, "The public is watching closely and we must see to it that the price we ask for our coal is just to all concerned. The time is here when no industry, however important or necessary, can be successful without the backing of public opinion. If we are going to sell our coal at reasonable prices and allow our sales organizations and distributors to exploit the public by asking exhorbitant prices for our coal, we are going to fail lamentably in perhaps the greatest crisis the present generation of coal men will be called upon to experience.

"Let those of us who market our coal through wholesalers be very sure that these wholesalers are of the right kind, so that we shall know that our coal reaches the ultimate consumer with only a fair and reasonable margin added for selling commissions. Let us see to it that our coal does not pass through three or four hands before it is finally sold to the consumer. It is our duty to watch these things and thus curtail at least one probable source of profiteering. It must be borne in mind that we are the ones who will suffer if the coal industry is put back under Government control.

"It is well known that the coal industry in years past has been looked upon with suspicion, although whether or not this suspicion was justified does not enter into the present situation. It remains, however, that our sales organizations are the individual points of contact we have with the public. Therefore it is entirely up to us what kind of an impression we make with the public from now on.

"The future of the coal industry is in our hands, and it is entirely up to us to decide by our own actions whether we are to manage our business ourselves or whether we are to be supervised once more by some form of Government control. Let the motto of the coal industry be, 'Fair prices for all.'"

Freight Jam May Affect Coal Market

COAL operators will get small consolation from the fact that car shortage and freight delays are crippling industries other than coal. Protests lodged at Washington with the Interstate Commerce Commission and other bodies against present transportation conditions mean that others than coal shippers are feeling the pinch. The term car shortage will have a new meaning to people hereafter and other business will better appreciate the position and the complaints of the coal man when lack of cars and freight blockades cause nondelivery of needed fuel and are made the basis for higher prices because of increasing costs.

One aspect of the present situation should be kept before the coal shipper. With industry slackened by lack of transportation to handle in- and out-bound freight, and with coal a deferred class of movement, a prolongation of present conditions may cause a slump in the stringency in demand. Whether such a slump will materialize and, if it comes, whether it will be of significant proportions, depends on the relative size of stocks of fuel and of other raw materials in the hands of manufacturers.

Our American Industries

SPEAKING generally the basal industries of the country are in the control of Americans. Perhaps that is why their regulation has been so easy and so little resisted. All through the war it was the essential industries of the country which had to bear the brunt of regulation and often it seemed as if the purpose was to make easier the operation of those not so essential. Never did the basal industries fail to respond. Laws of doubtful constitutionality, contravening all former practice, were accepted patiently and without litigation, in the hope that the war might be thereby more speedily and completely won. Concessions equally great were made without legal compulsion or even semblance of it.

The coal industry in North America is directed almost wholly by Americans and former citizens of the British Isles. It accepted every kind of regulation—a control almost equivalent to Government ownership. It made an average profit of 10 per cent, with which compare the profit of the Federal Reserve Bank, which was ten times as great. Hardly any business made as little during the period of the war as did the coal industry. The capital of one luxury-manufacturing corporation has just been increased from $3,000,000 to $100,000,000 without taking in new investors. Probably there is a little water in the stock, but what a large quantity of ploughed-in profits must be represented by that huge capitalization!

Water-Power Legislation and Coal

PERHAPS the so-called "super-power" project to study which the sum of $125,000 is to be alloted by Congress is as yet too much of a dream to excite the active interest of coal men. Coupled with water-power legislation now pending in Washington this measure would reorganize power production and distribution and transportation on the Atlantic seaboard and thereby reduce by one-half the steam coal used in this area, in which it is said 40 per cent of the bituminous coal produced in the country is consumed.

The water-power bill is designed to permit the general development of latent water power by private capital. In sections such as the South and West, where water power has been exploited, coal has lost markets and the further use of water to run the wheels of industry will still further reduce the demand for coal.

The prospect is not one, however, to frighten the coal producer, for it is inevitable that use creates new uses, and power, whether from coal, water or oil, will be demanded in ever-increasing quantity as time goes on. A single feature of the dream of the super-power project, the electrification of the railroads in the East, will so increase the effectiveness of our transportation system in this sadly congested area that new high limits on tidewater shipments can be reached.

Assigned Cars

OBJECTION to assigned cars was crystallized during the war by the extension of the practice to include commercial shipments in addition to railroad fuel. Prior to the summer and fall of 1917 the common practice was for railroads to make contracts with producers of bituminous coal guaranteeing a full car supply and often, if not usually, providing a minimum delivery that furnished the mine steady running time. The advantage of steady operation in reducing costs was as well known then as now, though not so scientifically expressed as by the Engineers Committee of the Fuel Administration. No such objection to such contracts were then made as are now voiced. Some operators regularly engaged in the business of supplying railroad fuel while others preferred to ship commercial coal. The producer who elected to tie up with the railroads was planning to take a smaller profit per ton on his product but a surer one—the operator who held his coal for the spot market was playing for larger profit.

The industry was on this basis for years, with sharp controversies each spring when the question of price came up for discussion between the operators and the fuel purchasing agents of the roads. Meetings were held at which the producers were told what price would be paid for coal that year and they usually had no choice but to accept if they desired railroad business. The certainty of a minimum of business in the dull summer time and of a full car supply in the winter if there should be a car shortage, was weighed against the low price, for beyond question the railroads used the power of the assigned car to secure a low price. The operators were unorganized, their objections were without weight and the railroads got their coal at their own figures.

A new era in the coal industry began with the contract season of April, 1917. Demand was without parallel and prices were higher than ever before recorded. The railroads were in financial straights and were trying to save on their coal bills by holding down the prices. The market for bituminous coal was so strong that assigned cars ceased to hold the lure of the past and many roads were unable to contract for their requirements, because they would not pay the going price. Such was the condition when in September, 1917, the Fuel Administration began its work. One of the first obligations assumed by the organization was the provision of coal for the railroads and certain essential industries that had failed to cover their requirements by contract. Priority orders for the roads were issued requiring shippers to give preference to engine fuel contracts. The Fuel Administration, acting with the Car Service Commission of the American Railway Association, assigned cars for industrial consumers and needy and negligent public utilities. This system of distribution failed utterly to meet the situation and was particularly obnoxious to the producers because in the stormy months in the winter of 1917-18 the assigned cars absorbed the available supply throughout the East and nothing was left for commercial customers not favored as war essentials.

After a bitter fight lasting more than a month between the Railroad Administration on one side and the operators backed by the Fuel Administrator on the other, assigned cars were, in May, 1918, forbidden by order of the President. The conditions under which they were abolished are important to bear in mind at this time. Government prices were in effect—one price for all. The railroads could not buy coal with cars. Price was eliminated from the equation. Distribution was absolutely in the hands of the Government and the roads could be and were assured of the proper share of the coal, in fact their requirements were given first preference. With the President maintaining his policy of the same price to all and the supply assured, the railroads did not need assigned cars.

In the spring of 1919, when contracts for the ensuing coal year were made, the roads were yet under Government supervision and the ban on assigned cars was still in effect. The demand for coal was so light, however, that no difficulty was experienced in making fuel contracts, although the matter of price was the subject of bitter controversy and sharp recriminations. The operators were better organized than before the war and better knew how to secure fair prices for their product. They had learned their costs and were disposed to hold prices above those costs. Government control of the railroads ceased on March 1, 1920, and on April 16 the Interstate Commerce Commission removed the restrictions on assigned cars.

Honest efforts were made by the representatives of the roads and the National Coal Association to get together on a program that would give assurance of an adequate fuel coal supply without the use of assigned cars. The effort failed, and failed because the operators are without legal power to collectively talk prices. Furthermore, the operators' associations are without power to allocate orders for coal among their members for any purpose and to insist upon and require the fulfillment of the orders. In other words, the two conditions that obtained during the period of Government control, assurance of price and of supply, are no longer in effect. The purchasers of fuel coal see in assigned cars a means to secure both, and until some plan is evolved the practice will be followed. The next move is up to the operators. Some new plan must be brought forth.

Seasonal Freight Rates Will Affect Coal Fields in Varying Degrees*

Differentials Recommended by the Engineers Greatly Increase the Incentive to Summer Buying—The Maximum Discount Proposed Is More Than Three Times the Normal Drop in Spot Prices in the Pittsburgh District

BY F. G. TRYON

HEARINGS on the seasonal coal freight rate bills have developed sharp differences of opinion as to the wisdom of the proposed legislation. Support of the measure has been confined largely to the fields of the Middle West, whereas the testimony presented by representatives of the Appalachian operators was generally adverse. Into this controversy it is not my place to enter. As I see it, the business of the coal statistician of the Geological Survey is to publish facts and leave the task of taking action on the basis of the facts to others. This article is therefore limited to a brief presentation of certain facts which may help to clarify the discussion. It might have been expected that the universal application of any change in the existing rate structure would produce a whole crop of unexpected developments. This has been clearly brought out by the testimony at the hearing of the Senate committee considering the bill.

At the hearings on the seasonal coal freight rate bill, Senator Frelinghuysen asked Director Smith, of the Geological Survey, for his opinion of the proposed legislation. In his testimony, Doctor Smith introduced facts which it is believed should be made available to the coal fraternity while the subject is under discussion. COAL AGE has requested F. G. Tryon, in charge of coal statistics for the Geological Survey, who prepared the exhibits, to summarize these new data.

Two bills are now before the committee, the original bill, introduced by Senator Frelinghuysen (S. 4,087), and a substitute bill (S. 4,278), proposed by a committee of the American Institute of Mining and Metallurgical Engineers, headed by Eugene McAuliffe. The first bill provides for a decrease of 15 per cent in all coal freight rates during the months from April to August, inclusive, of each year, and a corresponding increase of 15 per cent over the base rate during the remaining months of the year.

The substitute bill, introduced by the engineers, proposes three modifications of this plan: Fixed differentials in cents per ton are substituted for the percentage differentials; the differentials are graduated from month to month; the period of discount is from February to July instead of from April to August. At the hearings preference was generally expressed for the substitute bill, as far, at least, as the differentials were concerned.

Now what do these differentials proposed in the engineers' bill mean in terms of the average freight rate on coal? The differentials vary from minus 25 cents in March, April and May to plus 25 cents in October, November and December. According to the Bureau of Railway Economics, the average freight rate on coal is about $1.56 for bituminous and $2.28 for anthracite, both per net ton. These were the figures prevailing in 1919. They represent the average revenue per ton of revenue coal hauled by all roads in that year. The weighted average for anthracite and bituminous would be about $1.68 per net ton. In terms of this average freight rate the engineers' differentials would therefore vary from minus 15 per cent to plus 15 per cent. Table I gives the differential for each month, first in cents per ton, and then in per cent of the average freight rate. In the last column of the table the modified freight rate is expressed as an index number. Thus if the average for the year be taken as 100, the January rate will be 106; the rate in February, 95; in March, 85, etc.

Having reduced the freight rate, as it would be modified by the engineers' bill, to index numbers, we can now compare it with index numbers of the monthly changes in production. This is done in Table II. The first column represents points above or below the average freight rate, assuming the engineers' differentials to be applied. In the last three columns the production figures are shown in the same way.

The year chosen is 1913, the latest normal year. Thus in the month of April the engineers' differentials provide a discount of minus 15 points. The United States production in the same month of 1913 was 16 points below the average. Production in the Appalachian region was 15 points below, and in the Western States 17 points below.

TABLE I.

WHAT THE DIFFERENTIALS PROPOSED IN THE ENGINEERS' BILL (S. 4,278) MEAN IN PER CENT OF AN AVERAGE COAL FREIGHT RATE

Months	Average Freight Rate Per Net Ton*	Differentials Proposed in Engineers' Bill (S. 4,278)	Differentials Expressed in Per Cent of Average Freight Rate	Index Number of the Modified Freight Rate ($1.68=100)
January	$1.68	+10c	+ 6%	106
February	1.68	—10c	— 6%	94
March	1.68	—25c	—15%	85
April	1.68	—25c	—15%	85
May	1.68	—25c	—15%	85
June	1.68	—15c	— 9%	91
July	1.68	— 5c	— 3%	97
August	1.68	+ 5c	+ 3%	103
September	1.68	+15c	+ 9%	109
October	1.68	+25c	+15%	115
November	1.68	+25c	+15%	115
December	1.68	+25c	+15%	115

*Average revenue per ton of revenue coal (both anthracite and bituminous) hauled by all roads in 1919.

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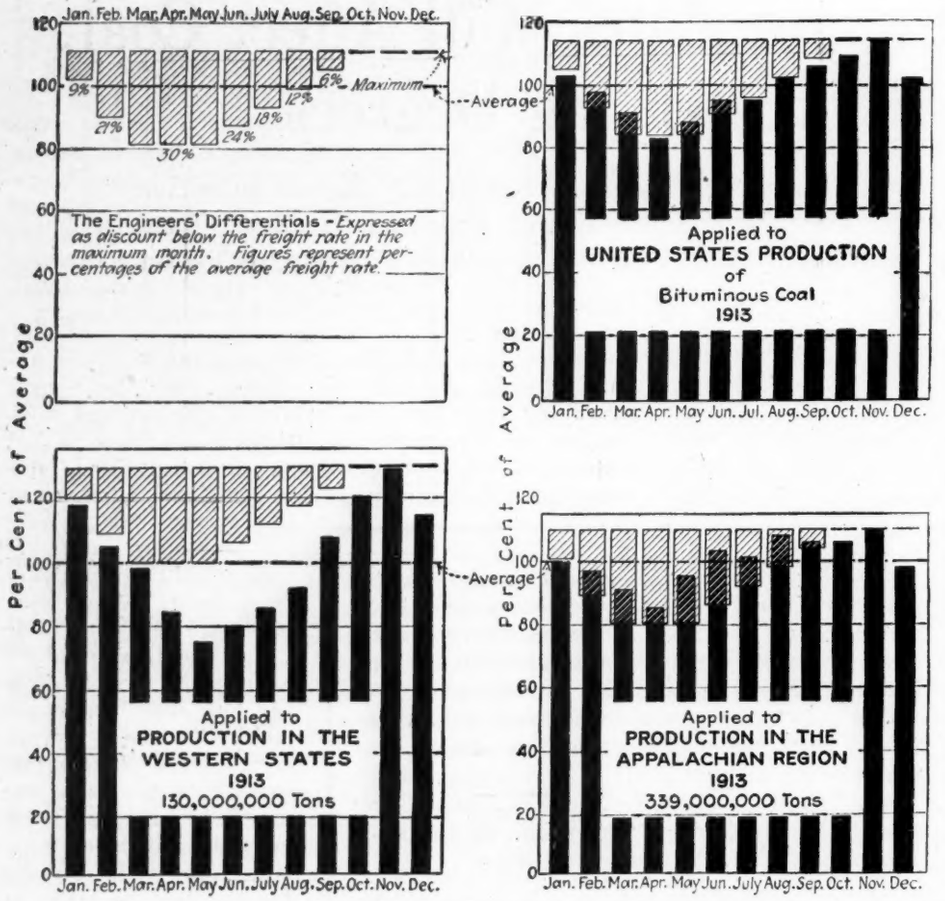
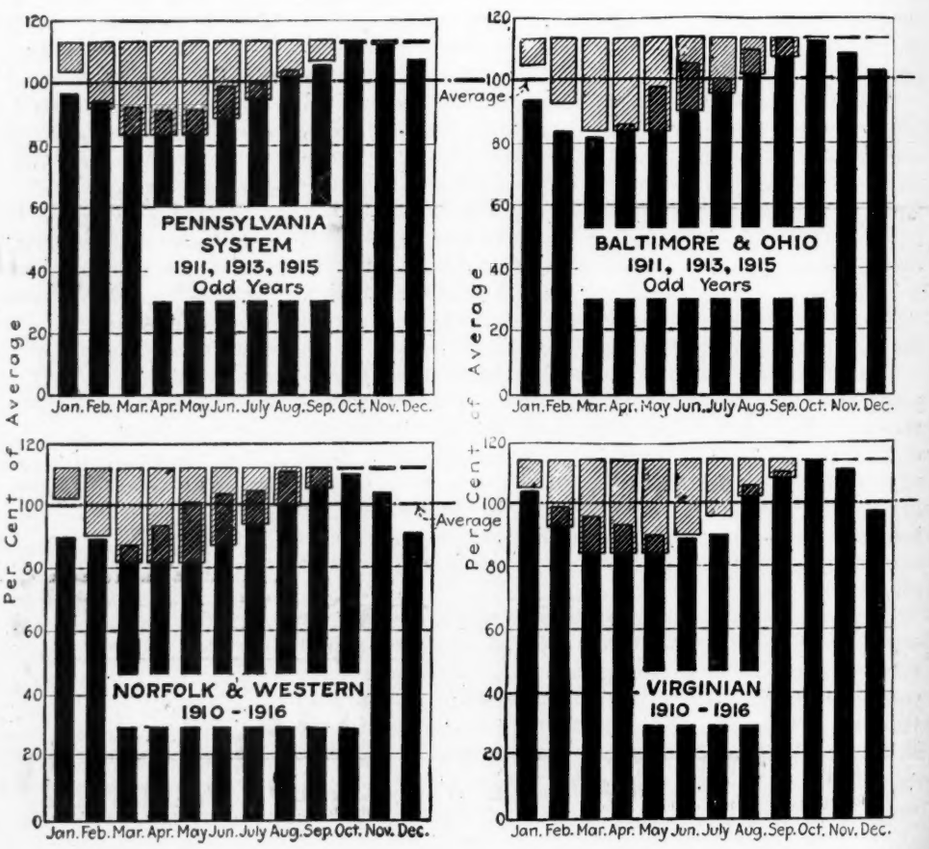

Jan. Feb. Mar. Apr. May Jun. July Aug. Sep. Oct. Nov. Dec.
9%
21%
30%
24%
18%
12%
6%
Maximum
The Engineers' Differentials - Expressed as discount below the freight rate in the maximum month. Figures represent percentages of the average freight rate.
Per Cent of Average
Average
Applied to UNITED STATES PRODUCTION of Bituminous Coal 1913
Applied to PRODUCTION IN THE WESTERN STATES 1913 130,000,000 Tons
Applied to PRODUCTION IN THE APPALACHIAN REGION 1913 339,000,000 Tons

Fig. 1. Seasonal Rates Compared with Production

In this diagram the monthly differentials in freight rates on coal, proposed by the engineers' bill, are expressed as discounts below the maximum rate. These discounts are then superimposed on the diagrams of production of a normal year of the Eastern fields, the Western fiields, and of the United States. The differentials are too great for the East, not sufficient for the West, but about fit the average of the whole country.

Fig. 2. How Proposed Rates Would Affect Leading Coal-Carrying Roads

The discounts below maximum shown in Fig. 1 are here shown applied to four of the leading coal-carrying railroads. The system appears more nearly to meet the seasonal lag in production on the Pennsylvania than on the other roads. The discounts should be shifted several months to suit the Norfolk & Western, where the maximum rate of production is in August to October, rather than in the winter.


Per Cent of Average
Average
PENNSYLVANIA SYSTEM 1911, 1913, 1915 Odd Years
BALTIMORE & OHIO 1911, 1913, 1915 Odd Years
NORFOLK & WESTERN 1910 - 1916
VIRGINIAN 1910 - 1916
Jan. Feb. Mar. Apr. May Jun. July Aug. Sep. Oct. Nov. Dec.

Examination of the table will show that the engineers' differentials are well in step with the fluctuations in the production of the United States as a whole, but not so well in step with either the West or the Appalachian region, if taken separately. This is because the prevailing seasonal swing in the Appalachians is different from that in the West. The high months in the West are from September to February. In the Appalachians they are, generally speaking, from June to November.

TABLE II.

COMPARISON OF THE DIFFERENTIALS PROPOSED IN THE ENGINEER'S BILL (S. 4,278) WITH MONTHLY FLUCTUATIONS IN PRODUCTION—1913.

Months	Engineers' Differentials	United States Production	Appalachian Region Production	Western States Production
January	+ 6	+ 4	— 0	+17
February	— 6	— 1	— 3	+ 4
March	—15	— 8	— 9	— 3
April	—15	—16	—15	—17
May	—15	—11	— 5	—26
June	— 9	— 4	+ 3	—21
July	— 3	— 4	+ 1	—15
August	+ 3	+ 3	+ 8	— 9
September	+ 9	+ 7	+ 6	+ 7
October	+15	+10	+ 6	+20
November	+15	+15	+10	+29
December	+15	+ 3	— 2	+14

(For comparison the monthly production statistics have also been converted to index numbers in which the average for the year equals 100. The figures given here are points above or below the average.)

To bring out these differences more clearly Diagram I has been prepared. The purpose of the differentials is, of course, to fill up the hollow between the peaks in the annual production curve. To visualize the effectiveness of the discounts proposed, we may draw a picture of them and then apply the picture to pictures of the monthly production drawn to the same scale. The differentials are shown in the upper left-hand corner of the diagram as a series of inverted columns each one of which represents a total discount below the maximum rate. They provide in January for a total discount of 9 points, or 9 per cent of the average. In February the discount becomes 21 points; in March, April and May, 30 points; in June it recedes to 24 points; in July, to 18 points; in August, to 12 points; in September, to 6 points, and in the months of October, November and December, when the maximum rate is in effect, there is no discount.

Now suppose we imagine this picture of the discounts lifted up bodily and placed on top of a picture of the monthly production of coal drawn to the same scale (upper right-hand corner). We can shift the discount picture up and down until the maximum line comes to rest at the top of the black column of maximum production, which happens to be in November. The position it would occupy is shown by the shaded overprint. If the differentials were perfectly adjusted the discount columns would supplement the heights of the production columns and fill the hollow in the production diagram, and they do so supplement very neatly the 1913 production for the country as a whole. But when we come to apply the discount diagram to the hollow in the production diagram for the Western

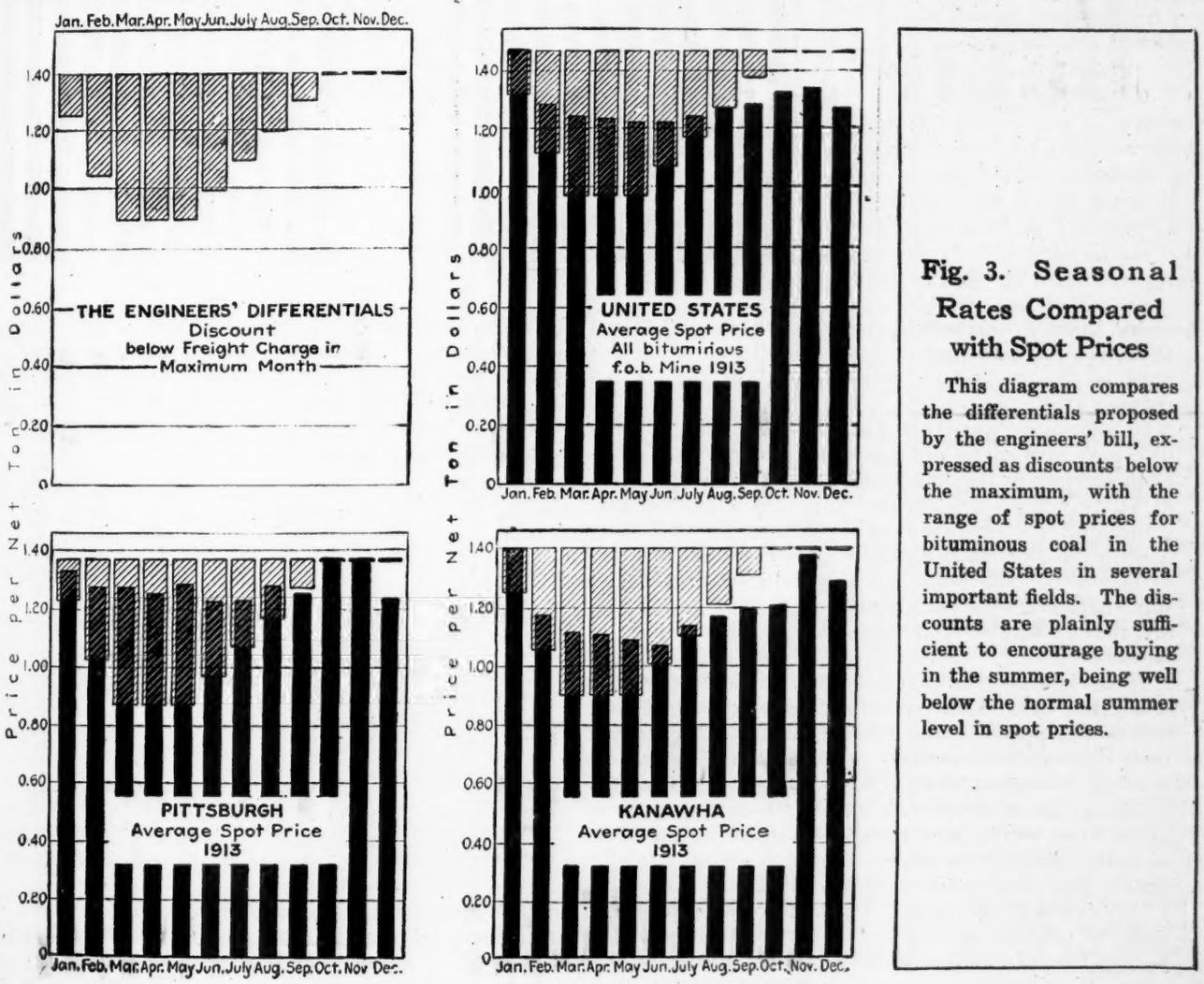


Fig. 3. Seasonal Rates Compared with Spot Prices

This diagram compares the differentials proposed by the engineers' bill, expressed as discounts below the maximum, with the range of spot prices for bituminous coal in the United States in several important fields. The discounts are plainly sufficient to encourage buying in the summer, being well below the normal summer level in spot prices.

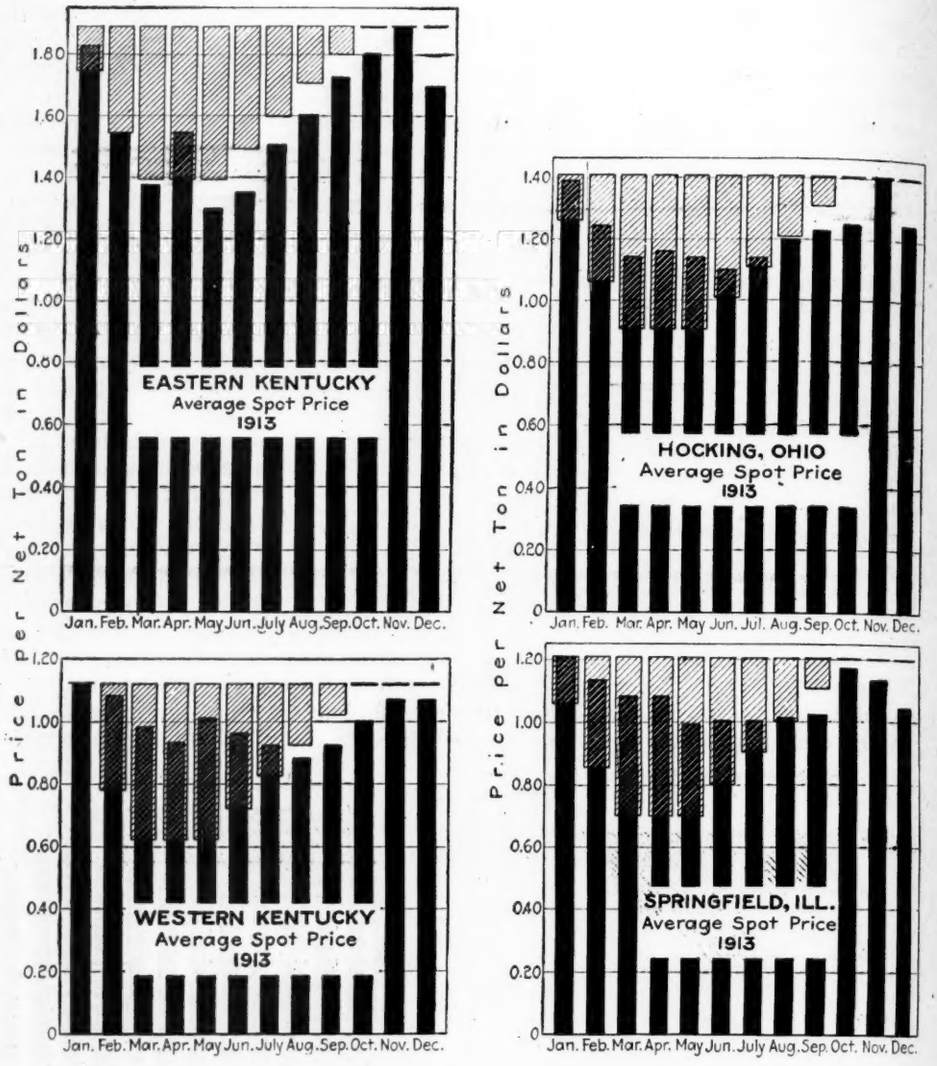


Fig. 4. Seasonal Rates Compared with Spot Prices

In three of the fields shown in this diagram the discounts offered by seasonal rates offer greater incentive to summer buying than have the drops in spot prices in the summer of a normal year. In eastern Kentucky the discounts in 1913 would not have equaled the drop in spot prices.

states, taken by themselves, the fit is not so satisfactory. It is even less satisfactory when the discounts are applied to the production diagram of the Appalachian region.

In the same way Diagram II shows the proposed discounts applied to shipments over four of the principal carriers in the Appalachian region. The discounts fit fairly well on the Pennsylvania and Virginian diagrams, but are somewhat out of place on the Baltimore & Ohio and Norfolk & Western. These examples might of course be multiplied, but they will suffice to show that there are wide variations from district to district, and that no single set of discounts can be devised to fit all cases.

It has been argued that a differential in freight rate would not be a more powerful inducement to storage in the summer than the natural slump in the market price of coal which normally occurs in the summer. To test this statement Table III was prepared. The year 1913 was one of active business in which the range of prices from winter to summer was apparently as great as may ordinarily be expected—much greater, for instance, than that in either 1914 or 1915.

The average spot price f.o.b. mine of all grades and sizes of bituminous coal in January, 1913, was $1.47 per net ton. January was the maximum month for that year. The lowest average price in any month was $1.23, in May. In other words, the maximum discount offered to the average purchaser of bituminous coal by the range of market prices was 24 cents for that year. In comparison with this figure the maximum discount offered by the engineers' differentials—50 cents per ton—appears very considerable.

TABLE III. COMPARATIVE INDUCEMENT TO STORAGE OFFERED BY PROPOSED SEASONAL RATES AND BY THE 1913 SUMMER SLUMP IN MINE PRICES

Months	Discount Below Freight Rate Maximum Month Under Engineers' Bill (S. 4,278)		Discount Below Average Spot F.o.b. Mine Price Maximum Month*
January	$0.15		0—Maximum month
February	.35		$0.18
March	.50		.22
April	.50		.23
May	.50		.24
June	.40		.24
July	.30		.22
August	.20		.19
September	.10		.18
October	0	Maximum months	.14
November	0		.12
December	0		.19

* Taken from Prices of Coal and Coke, 1913-1918, by C. E. Lesher. In 1913 the month of maximum price was January, when the weighted average spot price of all bituminous coals, all sizes, was $1.47 per net ton. In February the average was 18c. less; in March, 22 c. less, etc.

To visualize the magnitude of the engineers' discounts alongside the range in spot prices Diagrams III and IV have been prepared. The scheme of presentation is the same as that used in the preceding diagrams. In this

case, however, the differentials are expressed in cents per ton rather than in per cent of the average rate. The shaded overprint of the engineers' discount, it will be seen, overlaps the columns of average price in the majority of instances. Thus in the Pittsburgh district the market price at no time fell more than 15 cents below the maximum, a figure less than one-third of the discount afforded by the engineers' bill. The only one of the six districts shown in which the range of market spot quotations exceeded the engineers' discount was eastern Kentucky.

The diagrams would appear to indicate that the proposed differentials constitute a much larger incentive to store than do the ordinary fluctuations in market prices. Especially does this appear probable when it is remembered that the buyer can count upon the freight differential but has no guarantee as to what the future market price may be. The price usually goes up in the fall, but it does not always do so, and in any case there is no means of predicting how much the rise will be.

The testimony at the hearings brought out the fact that the engineers' bill as drawn was not intended to apply to intrastate rates. This is a matter of great importance, as the strictly intrastate business, exclusive of shipments to tide and to the Lakes, and of railroad fuel is about 37 per cent of the total production.

TABLE IV—DISTRIBUTION OF BITUMINOUS COAL PRODUCED IN THE UNITED STATES, 1917 AND 1918, BY ROUTES AND DESTINATIONS (a)

	1917		1918	
	Net Tons	Per Cent	Net Tons	Per Cent
Used within the State	201,000,000	37	209,000,000	36
Shipped to other States	129,000,000	23	137,000,000	24
Used by railroads	146,000,000	26	149,000,000	26
Exported by rail	9,000,000	2	11,000,000	2
Shipped to tidewater	39,000,000	7	45,000,000	8
Shipped to Great Lakes for cargo	28,000,000	5	28,000,000	5
Total production	552,000,000	100	579,000,000	100

(a) This statement does not include the tonnage reshipped from Lake Superior and Lake Michigan docks.

Table IV summarizes the statistics of coal distribution in 1917 and 1918.

If the Lake and tidewater business is to be excepted from the application of the seasonal rate, the tonnage to which the plan would be applicable is restricted to the 23 or 24 per cent shipped by rail from one state to another, plus whatever part of the 26 per cent used by the railroads is revenue coal in interstate business.

Federal Trade Commission Takes Issue with National Coal Association

IN answer to the assertion of the National Coal Association that, according to the rules of the game, the Federal Trade Commission should cease to ask for monthly cost reports because the first round of the fight in the Maynard Coal Co. case went against them, Commissioner Gaskill has just sent a letter to coal operators.

Mr. Gaskill says the commission did not agree to be bound by the result of one suit. In fact, pointing out some of the advantages of monthly coal cost reports, he asks support of operators in making them a success. Many reports, he says, continue to be received. The letter is as follows:

"I am writing to acknowledge the receipt of your letter, advising the commission that your Company deems it inadvisable to furnish monthly cost reports pending final adjudication by the courts of the power of the Federal Trade Commission to require such reports from coal mining companies.

"We note your statement that this position is, as you understand it, in harmony with arrangements made with the attorneys representing the commission with relation to the suit brought by the Maynard Coal Company.

"We fear that in some way a misunderstanding with reference to the attitude taken by the commission in this regard has arisen, and for this reason desire to make it clear to you that, following suggestions made to us that it would be advisable to test the constitutionality of the statute by which the production of these reports was authorized, we consented to co-operate in the early presentation of a series of actions, but we did not agree that, in event of a decision in one of these cases adverse to the exercise of the statutory power, the commission should be bound thereby with respect to other companies not parties to the action.

"if it has been represented to you that the commission agreed to accept an adverse finding in one of these cases as conclusive as to all companies pending a final adjudication, we regret to say that the attitude of the commission has not been properly understood or interpreted to you.

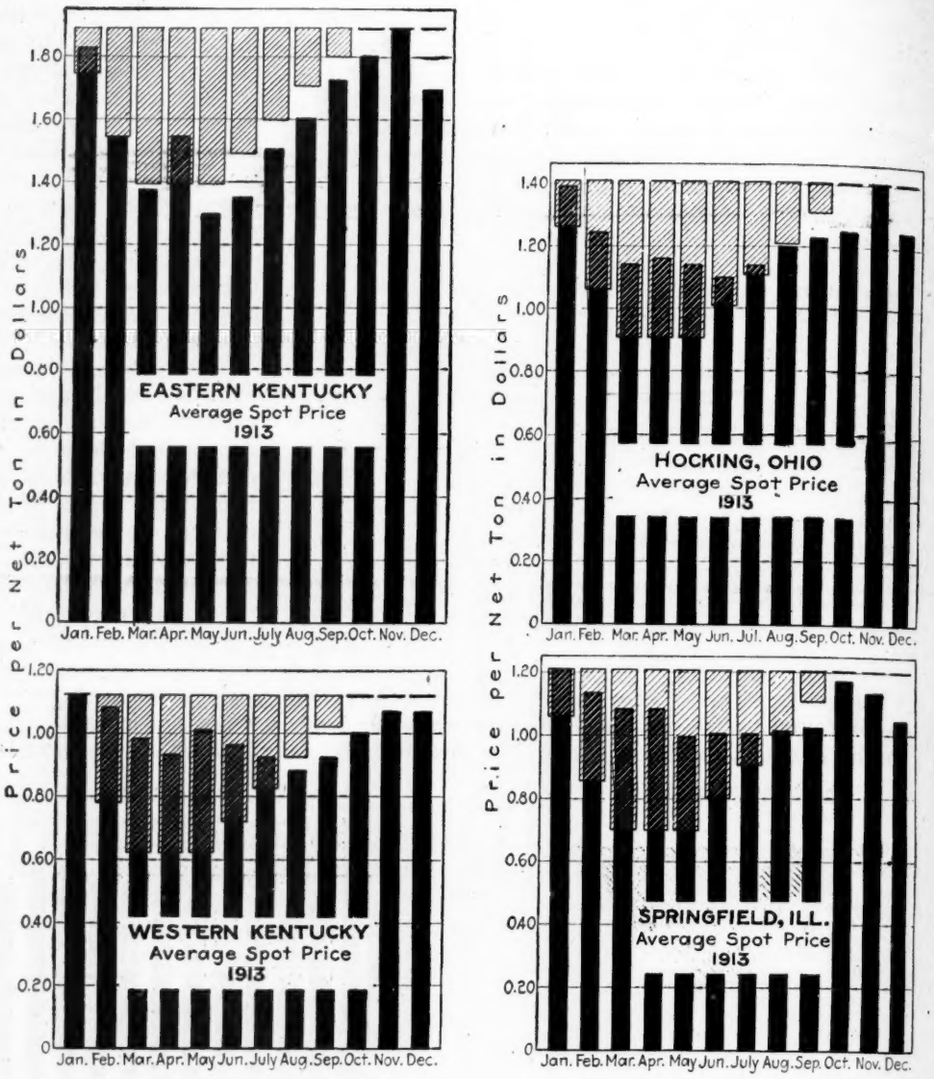
"The purpose which the commission is endeavoring to serve by the collection of these cost reports, and the issue of monthly bulletins based thereon, was deemed by Congress to be in the public interest, and the commission does not believe that it should regard this determination of public interest as dispelled by the single decision recently pronounced.

"We find that a very large number of coal operators are sufficiently impressed by the value of having on record with a disinterested body the actual facts connected with their coal production as to lead them to waive any question arising out of this decision, and not only to furnish the reports but to urge that the commission to continue this collection and publication of its monthly bulletins. The existence of this body of facts and figures is valuable both to the operators and to the general public; to the former because it is their protection against suspicion and to the latter because it affords a proper basis from which to draw conclusions.

"The commission earnestly desires to obtain the results contemplated by the statute without resort to penalty proceedings, and in view of the fact that so large a proportion of the coal operators realize the value of these reports, the commissions entertains the hope that irrespective of the Maynard decision it will continue to receive through the co-operation of the operators the facts which will serve as a basis of cost ascertainment.

"The commission submits to those operators who are not now within the scope of the Maynard decision, but who are inclined to take the effect thereof to themselves, that they consider this question in the long view whether it is not to their interests as well as to those of the general public whom they serve, to record the actual facts connected with their industry."

On May 8 President Wilson issued an executive order directing the Council of National Defense to take over the records of the War Labor Board and complete any unfinished business.



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states, taken by themselves, the fit is not so satisfactory. It is even less satisfactory when the discounts are applied to the production diagram of the Appalachian region.

In the same way Diagram II shows the proposed discounts applied to shipments over four of the principal carriers in the Appalachian region. The discounts fit fairly well on the Pennsylvania and Virginian diagrams, but are somewhat out of place on the Baltimore & Ohio and Norfolk & Western. These examples might of course be multiplied, but they will suffice to show that there are wide variations from district to district, and that no single set of discounts can be devised to fit all cases.

It has been argued that a differential in freight rate would not be a more powerful inducement to storage in the summer than the natural slump in the market price of coal which normally occurs in the summer. To test this statement Table III was prepared. The year 1913 was one of active business in which the range of prices from winter to summer was apparently as great as may ordinarily be expected—much greater, for instance, than that in either 1914 or 1915.

The average spot price f.o.b. mine of all grades and sizes of bituminous coal in January, 1913, was $1.47 per net ton. January was the maximum month for that year. The lowest average price in any month was $1.23, in May. In other words, the maximum discount offered to the average purchaser of bituminous coal by the range of market prices was 24 cents for that year. In comparison with this figure the maximum discount offered by the engineers' differentials—50 cents per ton—appears very considerable.

TABLE III. COMPARATIVE INDUCEMENT TO STORAGE OFFERED BY PROPOSED SEASONAL RATES AND BY THE 1913 SUMMER SLUMP IN MINE PRICES

Months	Discount Below Freight Rate Maximum Month Under Engineers' Bill (S. 4,278)	Discount Below Average Spot F.o.b. Mine Price Maximum Month*
January	$0.15	0—Maximum month
February	.35	$0.18
March	.50	.22
April	.50	.23
May	.50	.24
June	.40	.24
July	.30	.22
August	.20	.19
September	.10	.18
October	0	.14
November	0	.12
December	0	.19

* Taken from Prices of Coal and Coke, 1913-1918, by C. E. Lesher. In 1913 the month of maximum price was January, when the weighted average spot price of all bituminous coals, all sizes, was $1.47 per net ton. In February the average was 18c. less; in March, 22 c. less, etc.

To visualize the magnitude of the engineers' discounts alongside the range in spot prices Diagrams III and IV have been prepared. The scheme of presentation is the same as that used in the preceding diagrams. In this

case, however, the differentials are expressed in cents per ton rather than in per cent of the average rate. The shaded overprint of the engineers' discount, it will be seen, overlaps the columns of average price in the majority of instances. Thus in the Pittsburgh district the market price at no time fell more than 15 cents below the maximum, a figure less than one-third of the discount afforded by the engineers' bill. The only one of the six districts shown in which the range of market spot quotations exceeded the engineers' discount was eastern Kentucky.

The diagrams would appear to indicate that the proposed differentials constitute a much larger incentive to store than do the ordinary fluctuations in market prices. Especially does this appear probable when it is remembered that the buyer can count upon the freight differential but has no guarantee as to what the future market price may be. The price usually goes up in the fall, but it does not always do so, and in any case there is no means of predicting how much the rise will be.

The testimony at the hearings brought out the fact that the engineers' bill as drawn was not intended to apply to intrastate rates. This is a matter of great importance, as the strictly intrastate business, exclusive of shipments to tide and to the Lakes, and of railroad fuel is about 37 per cent of the total production.

TABLE IV—DISTRIBUTION OF BITUMINOUS COAL PRODUCED IN THE UNITED STATES, 1917 AND 1918, BY ROUTES AND DESTINATIONS (*a*)

	1917		1918	
	Net Tons	Per Cent	Net Tons	Per Cent
Used within the State	201,000,000	37	209,000,000	36
Shipped to other States	129,000,000	23	137,000,000	24
Used by railroads	146,000,000	26	149,000,000	26
Exported by rail	9,000,000	2	11,000,000	2
Shipped to tidewater	39,000,000	7	45,000,000	8
Shipped to Great Lakes for cargo	28,000,000	5	28,000,000	5
Total production	552,000,000	100	579,000,000	100

(*a*) This statement does not include the tonnage reshipped from Lake Superior and Lake Michigan docks.

Table IV summarizes the statistics of coal distribution in 1917 and 1918.

If the Lake and tidewater business is to be excepted from the application of the seasonal rate, the tonnage to which the plan would be applicable is restricted to the 23 or 24 per cent shipped by rail from one state to another, plus whatever part of the 26 per cent used by the railroads is revenue coal in interstate business.

Federal Trade Commission Takes Issue with National Coal Association

IN answer to the assertion of the National Coal Association that, according to the rules of the game, the Federal Trade Commission should cease to ask for monthly cost reports because the first round of the fight in the Maynard Coal Co. case went against them, Commissioner Gaskill has just sent a letter to coal operators.

Mr. Gaskill says the commission did not agree to be bound by the result of one suit. In fact, pointing out some of the advantages of monthly coal cost reports, he asks support of operators in making them a success. Many reports, he says, continue to be received. The letter is as follows:

"I am writing to acknowledge the receipt of your letter, advising the commission that your Company deems it inadvisable to furnish monthly cost reports pending final adjudication by the courts of the power of the Federal Trade Commission to require such reports from coal mining companies.

"We note your statement that this position is, as you understand it, in harmony with arrangements made with the attorneys representing the commission with relation to the suit brought by the Maynard Coal Company.

"We fear that in some way a misunderstanding with reference to the attitude taken by the commission in this regard has arisen, and for this reason desire to make it clear to you that, following suggestions made to us that it would be advisable to test the constitutionality of the statute by which the production of these reports was authorized, we consented to co-operate in the early presentation of a series of actions, but we did not agree that, in event of a decision in one of these cases adverse to the exercise of the statutory power, the commission should be bound thereby with respect to other companies not parties to the action.

"if it has been represented to you that the commission agreed to accept an adverse finding in one of these cases as conclusive as to all companies pending a final adjudication, we regret to say that the attitude of the commission has not been properly understood or interpreted to you.

"The purpose which the commission is endeavoring to serve by the collection of these cost reports, and the issue of monthly bulletins based thereon, was deemed by Congress to be in the public interest, and the commission does not believe that it should regard this determination of public interest as dispelled by the single decision recently pronounced.

"We find that a very large number of coal operators are sufficiently impressed by the value of having on record with a disinterested body the actual facts connected with their coal production as to lead them to waive any question arising out of this decision, and not only to furnish the reports but to urge that the commission to continue this collection and publication of its monthly bulletins. The existence of this body of facts and figures is valuable both to the operators and to the general public; to the former because it is their protection against suspicion and to the latter because it affords a proper basis from which to draw conclusions.

"The commission earnestly desires to obtain the results contemplated by the statute without resort to penalty proceedings, and in view of the fact that so large a proportion of the coal operators realize the value of these reports, the commissions entertains the hope that irrespective of the Maynard decision it will continue to receive through the co-operation of the operators the facts which will serve as a basis of cost ascertainment.

"The commission submits to those operators who are not now within the scope of the Maynard decision, but who are inclined to take the effect thereof to themselves, that they consider this question in the long view whether it is not to their interests as well as to those of the general public whom they serve, to record the actual facts connected with their industry."

On May 8 President Wilson issued an executive order directing the Council of National Defense to take over the records of the War Labor Board and complete any unfinished business.

A new suggestion for handling the problem of seasonal movement of coal is contained in the suggestion of prominent coal operators that in the summer months a drawback on the freight charges be allowed for coal that is put into storage, thus encouraging the very thing for which the seasonal rates are devised. What do you think of the proposal?

Seasonal Rate Bill Reported by Committee

A SEASONAL coal freight rate bill has been agreed upon by the Frelinghuysen sub-committee and reported favorably to the full Senate Interstate Commerce Committee, of which Senator Cummins of Iowa is chairman. The bill as reported embodies the rates and the months proposed in the engineers' bill. No exemptions are made for shipments to tidewater or on coal intended for transshipment over the Great Lakes. When the rate is seventy-five cents or less it is excluded from the provisions of the bill. The Interstate Commerce Commission is given more latitude than in either of the bills which had been proposed. The scope of the bill has been extended somewhat and includes anthracite and bituminous coal, coke, lignite, briquets, boulets and petroleum coke.

Since Congress apparently is determined to have some form of seasonal coal rate legislation, operators are discussing an alternative proposition. It is suggested that a form of drawback be arranged on coal actually stored. Such an arrangement, it is pointed out, would not reward the purchaser who accepts the freight reduction but who does not store the coal. Since the avowed object of the bill is to promote storage, several prominent operators, at least, are of the opinion that the drawback proposition would do more to insure storage than a blanket reduction in rates. It is their belief that such a proposition is feasible and that it could be carried out as easily as are the milling-in-transit rates and other such tariff arrangements.

In its unanimous report to the full committee the sub-committee report itemizes the beneficial results which may be expected from the seasonal rate, as well as the principal objections which are raised against such rates. Reasons are advanced in an effort to show that these objections are untenable. These analyses are those which were announced by Senator Frelinghuysen several months ago in the course of one of his speeches on the subject in the Senate. As they have been published widely, they will not be repeated here. Extracts from the report of the committee are as follows:

"The Interstate Commerce Commission, to whom was referred the bill (S. 4278) to further amend the Interstate Commerce Act, as amended, having had the same under consideration, having conducted extended hearings respecting both bills, and having heard the testimony of numerous coal operators, coal dealers and representatives of chambers of commerce and other local business associations, in addition to the testimony of the director of the United States Geological Survey, the chairman of the Interstate Commerce Commission, and a representative of the railroads, reports thereon with the recommendation that the bill be passed with amendments.

"This bill incorporates amendments suggested by Chairman Edge E. Clark, of the Interstate Commerce Commission. It has the unqualified and unanimous approval of the members of that commission. The bill S. 4087 proposed that rates on coal should be 15 per cent less than the tariff rate from April 1 to Aug. 31 in each year, and 15 per cent above the tariff rate for the remainder of the year.

"While a considerable number of coal operators appeared at the hearings and testified against the proposed legislation, the opposition of the operators was by no means unanimous. One of the most earnest advocates of this legislation is Eugene McAuliffe, of St. Louis, Mo., a gentleman who has had many years of experience in connection with the operation of railroads.

"Most of the operators who opposed the legislation founded their objections on local consideration peculiar to their own properties in relation to the changes in rates proposed in this legislation. For example, certain operators whose coal is of such inferior quality that it will not store satisfactorily feared the introduction of rates which would encourage the storage of the coal produced by their competitors. The sub-committee feels, however, that legislation which will result in incalculable benefit for the whole public and which will entail but slight disadvantages for the great majority of mine operators, should not be denied approval because it may be injurious to the interests of isolated coal operators.

"Some of the criticism aimed at the proposed legislation was based on the fact that it affected coal moving to Lake Erie points for trans-shipment by water to upper Lake ports and coal moving to tidewater, as well as coal moving but a short distance. This bill remedies the latter objection by specifically excluding from its operation coal moving on rates of 75 c. or less. It also confers on the Interstate Commerce Commission the broadest discretion to alter or modify the prescribed differentials where their enforcement might result in unreasonable hardship to individuals, communities or carriers, thus permitting the commission to examine carefully and to remedy peculiar local situations.

Summer Storage is the Solution

"The committee realizes, of course, that the feasibility and effectiveness of the proposed legislation depend very largely upon the practicability of storing coal in large and small quantities. It therefore solicited and received a large amount of testimony from such experts as George Otis Smith, director of the U. S. Geological Survey, various coal operators and from coal dealers on this point. As a result of this testimony and from information secured from correspondence, the committee entertains no doubt whatever that practically every kind of coal mined in the United States can be stored safely, conveniently and cheaply.

"The tonnage of coal produced which cannot be stored satisfactorily is almost negligible. The committee is of the opinion that most of the testimony advanced to cast a doubt on the feasibility of storing coal is based almost uniformly on a disinclination to change the present hand-to-mouth policy under which the country now obtains its coal, scarcely knowing one day whether the next day's supply of coal will be available or not. It feels that this ultraconservative attitude, in the face of constantly recurring coal famines, bringing unemployment and possible starvation in their wake, is entirely unwarranted."

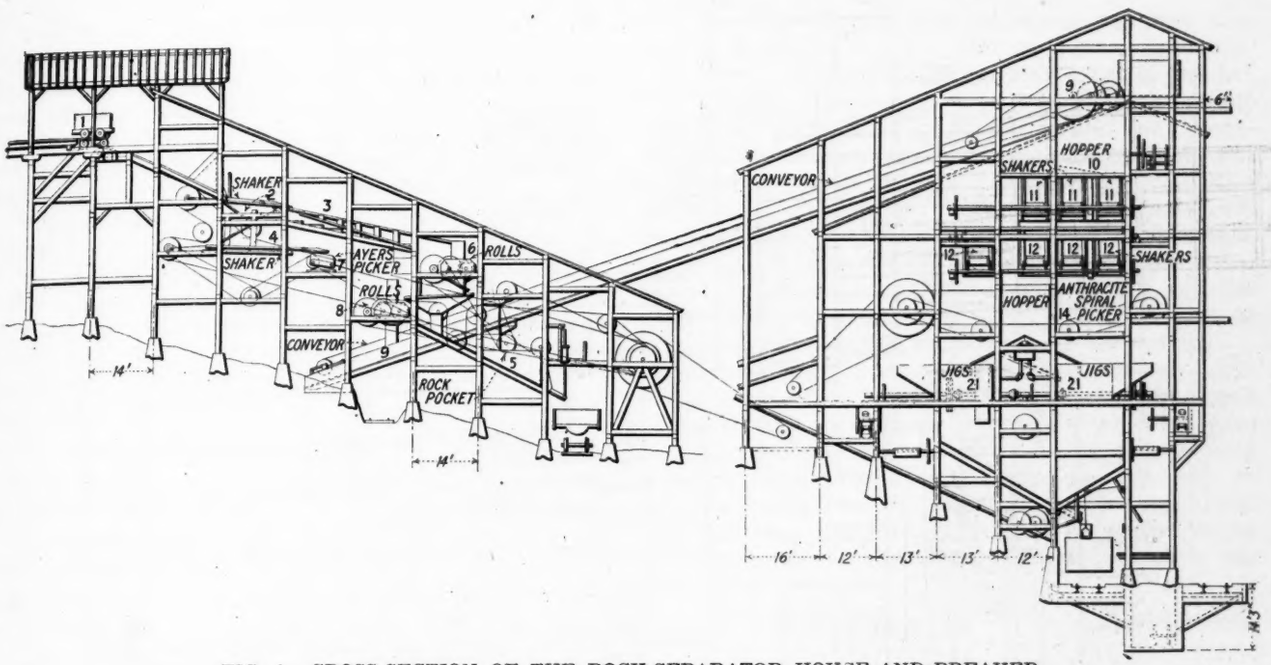


FIG. 1. CROSS-SECTION OF THE ROCK-SEPARATOR HOUSE AND BREAKER

Much of the rock is separated from the coal before it goes to the breaker proper. This simplifies the problem of breaker preparation and saves much wear and tear on the breaker machinery.

An Anthracite Breaker That Is Different

Four Important Details, Differing from Ordinary Practice, Have Been Incorporated in the Design of This Breaker—These Innovations Have Been Tested and Found Satisfactory in Operation

BY DEVER C. ASHMEAD
Tarrytown, N. Y.

DURING the past few years breaker construction has been revolutionized. Probably the most advanced structure of this kind of all those built or rebuilt is the No. 11 breaker of the Lehigh Coal and Navigation Co., near Coaldale, Pa. This breaker has now been in operation less than a year, but the new features that were installed have been thoroughly tried out and have proved successful.

Four important details have been incorporated in the design of this breaker that are either entirely new or have been used only to a limited extent in plants previously built. Never before have all these features been combined in one breaker.

The new features, which will be described and discussed in the order named, are as follows: The rock-separator house, a different type of shaker screen from that usually employed, a combination of mechanical pickers and jigs and a system of motor drive controlled from one central point.

ROCK IS SEPARATED OUTSIDE MAIN BREAKER

Two main divisions are made in the preparation of the coal at this breaker. These are: The rock-separator house and the regular breaker. The function of the rock-separator house is indicated by its name. All that is done in this building is to remove the large rock from the coal and crush the large coal to its proper size for treatment in the breaker. Although scarcely new this system is not common. It has been employed elsewhere chiefly, however.

The rock house is part of the original breaker and is constructed mainly of wood. The new breaker, however, is of the latest type of steel construction. The floors are of steel and concrete and no wood is used except where necessary in the machinery for the preparation of the coal. The motor houses, which will be referred to later are of concrete, while the transformer house is of brick.

BREAKER IS LOCATED HALF MILE FROM MINE

Steam locomotives haul the coal from the mines, which are about a half mile away, to the yard tracks. Thence the cars are transferred to the dump by means of a "godevil" or barney. A Lansford dump built by the coal company at its own shops is used to discharge the coal from the cars. This type of dump is operated by compressed air. It has an hourly capacity of 150 cars, each of three tons, making a total of 450 tons that can be handled every hour if necessary.

The accompanying illustrations show a cross section of the breaker and plans of the rock-separator house. All numbers used in the text to indicate the different pieces of machinery will be found to refer directly to the plans and elevation of the rock house and the breaker as well as to the flow sheet.

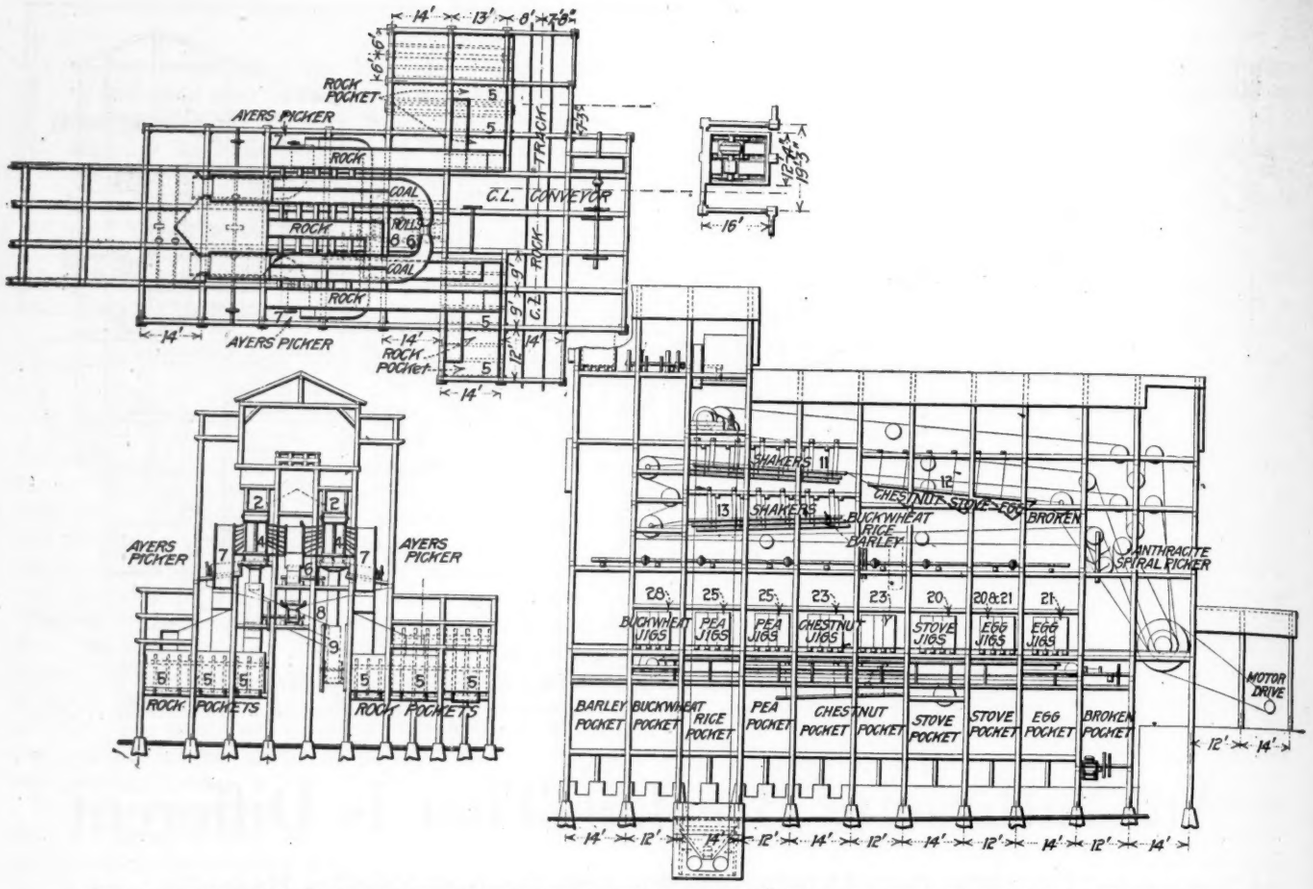


FIG. 2. PLAN AND CROSS-SECTION OF THE ROCK-SEPARATOR HOUSE, WITH SECTION OF THE BREAKER
Showing the arrangement of machinery in both buildings. The jig and shaker drives are at right angles to each other.

After being dumped the coal passes over the "bull shakers" (2), on which two sizes are made. Coal six inches and larger passes over these shakers while that under six inches passes through them. The large-size coal then goes over a picking chute (3), where the rock is separated and is sent direct to the rock pocket (5), while the coal passes through a set of rolls (6). Coal that passes through the bull shakers (2) goes over another set of shakers (4), on which two sizes are made, coal of steamboat size and larger, and coal smaller than steamboat. The larger size is picked on Ayres pickers, and the coal is passed to a set of rolls (8), while the rock is sent to the rock pocket (5). The size under steamboat coal from shaker (4) goes to the conveyor leading to the new breaker, as does the coal from the rolls (6) and (8) as shown in Fig. 4.

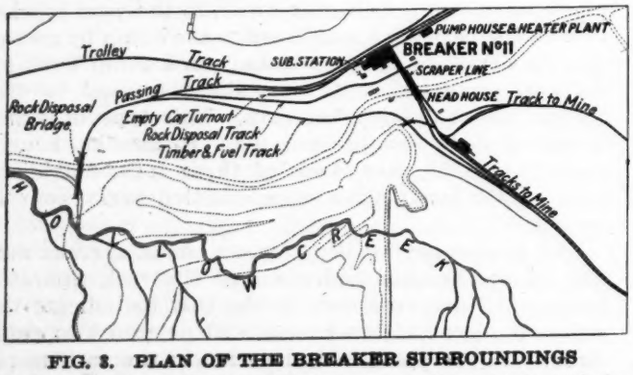


FIG. 3. PLAN OF THE BREAKER SURROUNDINGS
Showing the relation of the yard tracks to the breaker, and the tracks by which buildings, tracks, roads, rock and the like is disposed of and timber and fuel delivered.

This conveyor delivers the coal into a hopper (10) at the top of the new breaker, from which it is delivered by three feeders to three sets of shaking screens (11). On these shakers only two separations are made—over pea in size, and pea and under.

The over-pea size passes directly from the shakers (11) to the long shakers (12). As is rather unusual in the anthracite field, these long shakers have only one deck each but make four separations, namely, grate, egg, stove and chestnut coals. These shakers are thirty feet long; on the first twelve feet chestnut passes through, on the next nine feet stove coal passes through, on the last nine feet egg goes through, while the grate coal passes over. This grate coal then goes to three anthracite spiral coal pickers (14), on which the coal, bone and slate are separated. The coal is then hand picked and passes to the grate pocket, while the rock goes to the rock conveyor. The bone coal goes to a set of rolls (16), and from thence to the condemned coal conveyor (31). The rock from the spiral pickers (14) is hand picked and the coal recovered is sent to the grate pocket, while the rock is sent to the rock conveyor.

Egg coal from the long shakers (12) passes to a hopper (18) directly behind the egg jigs (21), of which there are three. They are of the double type, and the coal is fed to them uniformly from the hopper. The hopper is installed for the purpose of providing a constant and steady flow rather than an intermittent one. The hopper prevents the coal from entering the jigs so rapidly as to clog them. Consequently it tends to aid the jigs to prepare the coal more thoroughly.

The jigs are of the Elmore type and make 100 strokes per minute. The coal which leaves them goes to the egg pocket, but the rock is hand picked, the coal which is saved being thrown into the coal chute and passing with the balance of the coal to the pocket, while the rock goes to a shaking screen (33). Its subsequent treatment will be described later.

Preparation of the stove and chestnut is exactly the same as that given egg coal, just described, except that the treatment of chestnut coal differs slightly after its passage through the jigs. This slight change is that the rock from the jigs is not hand picked as is the case with the egg and stove coal. Three double jigs handle the stove coal and the same number take care of the chestnut.

Fine Coal Is Sized on Shaker Screens

From shaker (11) the pea coal and smaller passes to another shaker (12), which makes only one separation—pea and coals finer. The pea coal passes to the pea hopper (24), and from thence is fed to the pea jig (25), where it receives exactly the same treatment that the chestnut coal received, which has been previously described.

The fine coal from shaker (13) is passed to another shaker (26). This has three decks and prepares four sizes of coal, buckwheat, rice, barley and fine. Buckwheat coal is jigged just as is the pea and chestnut and receives the same subsequent preparation. Rice coal does not receive any further treatment and goes directly to the rice pocket. The barley coal, like rice, passes on without treatment. The fine coal from shaker 26 passes to shaker 33 and is fed onto its second deck, the rock from jigs 21, 22, 25 and 28 being treated upon the upper deck of the shaker.

Oversized rock goes to the rock conveyor while the undersized and the coal passes to the second deck of the shaker. All of the particles over ⅜ in. pass over this second deck and go to the condemned coal conveyor, while the finer particles pass through to another shaker (34), on which No. 2 barley is made. This size then goes to the No. 2 barley pocket, while the culm passes to the culm pump for delivery to the slush bank.

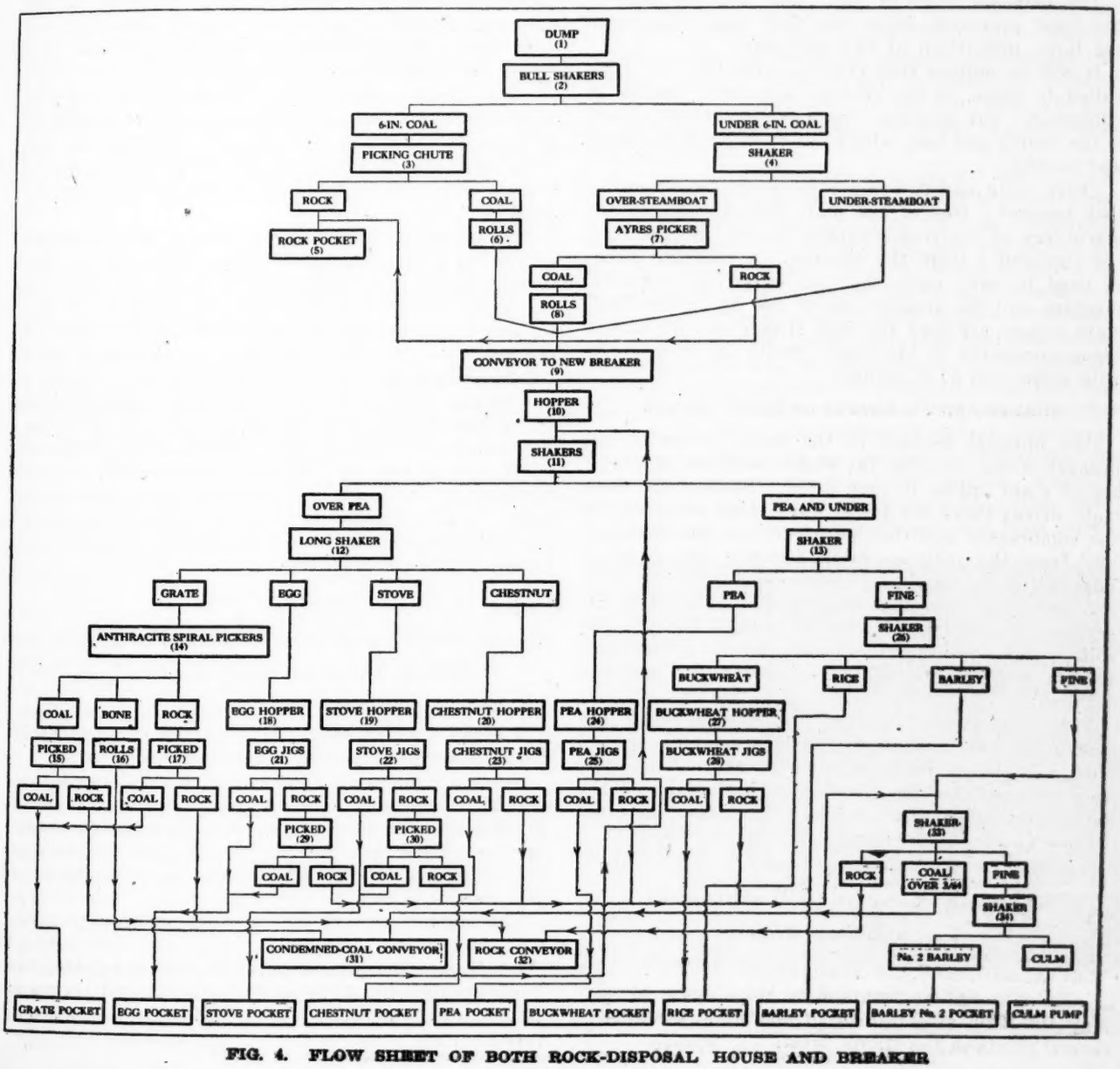


FIG. 4. FLOW SHEET OF BOTH ROCK-DISPOSAL HOUSE AND BREAKER

The coal which has been delivered to the condemned coal conveyor (31) is carried to the shaking screens (11) for retreatment. The rock which has been sent to the rock conveyor (32) is taken to the rock pocket and from here hauled to the rock bank.

Losses of Coal to Slate Pile Are Low

Some interesting results are obtained at this breaker and these may be of interest. The breaker itself has a capacity of approximately 2,000 tons in eight hours. The percentage of the different sizes of coal made, the amount of slate in the coal and also the percentage of the coal in the refuse slate are given in the following table:

Size of Coal	Per Cent of Size Made	Per Cent of Slate in Coal	Per Cent of Coal in Slate Refuse
Broken	3.8	...	2.0
Egg	7.8	2.0	2.0
Stove	9.7	3.5	2.8
Nut	17.2	5.0	3.1
Pea	10.6	8.0	3.5
Buckwheat	12.2	10.0	4.1
Rice	15.5	....	...
Barley	20.2	....	...
Barley No. 2	3.0	....	2.2

The domestic sizes of coal make 38.5 per cent of the total produced, while the fuel sizes amount to the large proportion of 61.5 per cent.

It will be noticed that thus far attention has been called to three of the reasons why this breaker is "different," but probably the most important reason is the fourth and last, which has to do with the drive and control.

Three main and two minor drives are employed in this breaker. One of the main drives operates the machinery of the rock-separator house, another runs the jigs and a third the shakers. A separate motor is used in each case, the jigs requiring a 400-hp. machine and the shakers one of 500 hp. Allis-Chalmers motors are used for both shaker and jig drives, being connected to the main shafts by 36-in. belts with pulleys on 50 ft. centers.

Shaker and Jig Shafts at Right Angles

One unusual feature in the main drives in the breaker is the fact that the shaker and the jig shafts are at right angles to each other. Besides the three main drives there are lesser ones—that required for the compressor and that necessary for the conveyor line from the rock-separator house to the breaker. This last drive requires a 250-hp. motor.

Alternating current is utilized at this breaker. It is received at 11,000 volts and is stepped down to 440 volts. The transformers used are Westinghouse 500-kva. instruments, which are housed in a separate building.

The most unusual feature of this breaker is the control. All the machinery can be started or stopped from a single control room in the breaker. This room is in telephonic communication with all parts of the building and as a result in case of accident the plant can be quickly shut down.

Morrow Returns to Washington From Western Trip

J. D. A. MORROW, the vice-president of the National Coal Association, returned to Washington Monday, May 10, 1920, after attending operators' meetings at several points in the Middle West.

Alcohol Is Already Being Produced From Coal on a Commercial Scale

ETHYL alcohol and its derivatives have been extracted successfully and on a commercial scale from coke-oven gas by Ernest Bury, of the Skinningrove Iron and Steel Works, in Great Britain. A perfect motor fuel has been produced and, as the adoption of the internal-combustion engine is rapidly extending, the importance of this development is apparent. The liquid-fuel resources of the world are strictly limited, but the consumption of these fuels is growing by leaps and bounds.

The practical working of Mr. Bury's process at the Skinningrove works, where 5,800 tons of coal are carbonized per week, has revealed an average yield of 1.6 gal. of alcohol per ton of coal carbonized, and as the total weight of coal which was reduced to coke in Great Britain in 1918 was 14,635,000 tons, the application of this process to the whole of this coal would yield 23,416,640 gal. of alcohol, representing at 2s. per gallon a sum of £2,341,664.

Having regard to the scarcity of liquid fuel that production in itself is important. It is national suicide for Great Britain or any other country to continue to burn any substance which might be converted into liquid fuel. The recovery of alcohol at the gas works of Great Britain would yield a further 27,000,000 gal., or taking alcohol and benzol together, the total quantity of liquid fuel available for extraction through the carbonizing of coal would be 114,000,000 gal., as against a present total consumption of 160,000,000 gal. per annum.

The process of extraction by contact with sulphuric acid is not a new discovery, but Mr. Bury was the first to establish it as a commercial proposition. The best results are achieved at a temperature of 60 to 80 deg. C., and in his process Mr. Bury carried utilization of the heat from the coke-oven plant to the utmost limit. Ether, chloroform, iodoform, acetic acid and acetone are among the derivatives which were obtained from this coke-oven gas after the benzol had been extracted.

Skinningrove was the only ironworks in Great Britain which during the war produced trinitrotoluol for the Ministry of Munitions and produced it on a prodigious scale. It was bombed by German aircraft on several occasions; possibly because work of this character was known to be carried on there.

Senate Sub-Committee Reports Favorably on Bill to Prevent Railroad Strikes

A SUB-COMMITTEE of the Senate Interstate Commerce Committee on May 13 reported favorably the Poindexter anti-strike bill for railroads.

Senator Poindexter, chairman of the sub-committee, said minor amendments would be attached which will not in any way invalidate or impair the efficacy of the measure, and added that the bill was designed "to prevent the tying up of interstate transportation on railroads of the country."

The bill will go back to the full committee, the Senator said, within a few days.

On May 12 the sub-committee favorably reported the Frelinghuysen bill to establish seasonal coal transportation rates, but action by the full committee was deferred.

Property Owners Try to Control a City Mine Fire by Strip Pit and Clay Bank

A Mine Fire of Unknown Origin Is Burning Under One of Pittsburgh's Most Exclusive Districts — It Has Already Destroyed Much Coal and Surface and Jumped a Clay Barrier

By DONALD J. BAKER
Pittsburgh, Pa.

PITTSBURGH and its immediate vicinity has been the scene of many mine fires. A number of these have been of an incipient nature, being early "nipped in the bud," while others have been more or less chronic and have caused to property owners and the city losses running into thousands of dollars. The stage for these fires has been set by topographical conditions, the number of hills within the city limits making a large area of cropping and lightly buried coal which does not underlie the entire city but is found only in the hilly regions, where it is fairly easy to trace its contour lines.

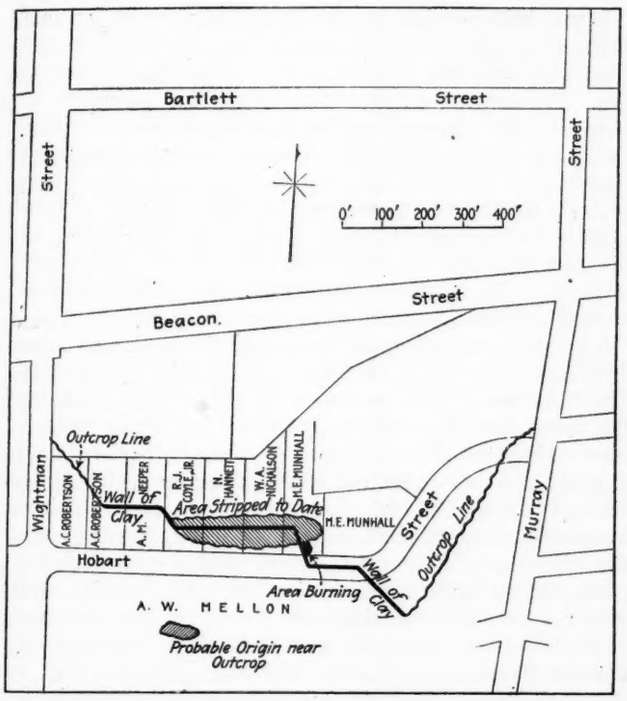


FIG. 1. MAP OF AREA WHERE FIRE IS BURNING
This shows a portion of the outcrop, the clay barrier that the fire has crossed and the property and street lines

Furthermore, the early history of the city shows that numerous small mines were opened and worked at intermittent periods, only to be finally abandoned. These make possible a rapid progress of any fires which may get started. The mines at the time of their operation were utilized exclusively for supplying the domestic needs of the suburban area adjacent.

In the eastern end of the city, which has been the section built up most rapidly in the last twenty years, there are many areas that are underlaid with coal. This particular section was mined during the early days and in a haphazard manner. The fact that the ground was undermined did tend in a small degree to make purchasers careful, but, with the proofs visible today of the disadvantages of this undermining it is safe to assume that, had the buyers foreseen the future, few if any of the lots would have commanded the fancy figures that were paid for them.

One of the latest fires that the city officials as well as the property owners have had to contend with has been in a portion of the Squirrel Hill district, which is considered one of the most exclusive residential sections of the city. Squirrel Hill, so called, lies adjacent to the Schenley Farms area of the East End, which in the last twenty years has been the scene of considerable building activity.

The section of this district which has been affected by the fire lies on a small hill, twenty acres of which are underlaid with coal averaging six feet in thickness. About forty years ago some of the coal was mined, but only to a limited extent. From appearances where the exposed portions of the mine can be seen it is safe to assume that it was developed quite crudely. The main entries are narrow, which indicates that the wheelbarrow probably was the chief means of transportation.

There is little evidence of posting having been employed in the development work while the pillars are large and in most cases untouched, though little assurance can be felt as to the manner in which the now burned-out area of the mine was worked. There is always a fire hazard present on those properties where coal crops out or where old workings have been driven.

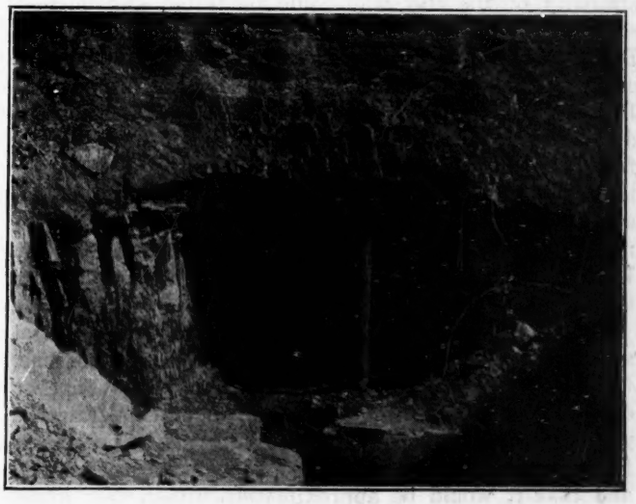
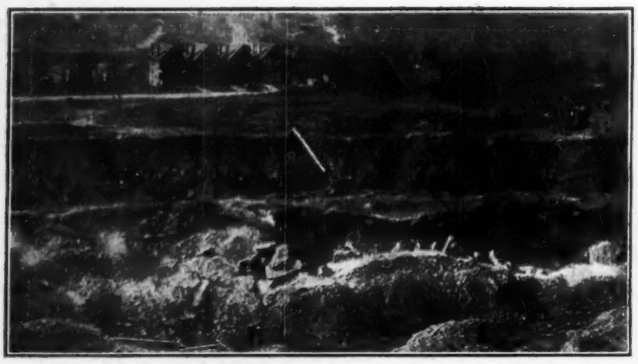


FIG. 2. ONE OF THE ENTRY OPENINGS
Eighteen inches of coal was left in the roof, evidently to protect the roof rock from weathering. This entry extends northward toward Beason St.



FIGS. 3 AND 4. PRESENT RUINS OF WHAT WAS ONCE AN IMPROVED CITY STREET

This shows what is left of Hobart St.—a mass of asphalt, paving bricks and baked clay. In some places the ground and débris are too hot to walk upon.

As a result, great care must be exercised at all times in the building of bonfires. It is not known how the fire which has recently caused so much concern originated, but it is believed to have started from the promiscuous building of fires when the land was being cleared.

In 1914 the city constructed an asphalt pavement on Hobart Street, which lies between Murray and Wightman streets. It was only a short time after the construction of this street that the fire broke out on the property south of Hobart (see Fig. 1). The coal outcrops on this property between Wightman and Murray streets and does not come to the surface again until Beacon Street is reached on the north. Thus the section of land bounded by Murray, Beacon and Wightman streets is a small hill.

The fire made such headway after the new street (Hobart) had been built that it was necessary for the city to take some action that same year. The coal burned toward Murray Street, roughly in a northwesterly direction from its point of origin. An excavation was made by the city from the outcrop line near Murray Street and extending across Hobart Street. A 3-ft. wall of clay was built as a barrier and it was believed at that time that the fire was under control and would soon burn itself out. At the points where the wall was constructed the coal is quite near the surface, having scarcely more than eight feet of cover.

However, the fire took a different course before the efficiency of the clay wall could be tested and burned so rapidly that it was soon under Hobart Street itself. By this time the property owners on the north had become alarmed lest the fire spread under the hill toward Beacon Street, where it would have been extremely difficult to control because at that point about forty feet of cover protected the bed. The city again came to the aid of the property owners in the spring of 1917 and extended the clay wall through to the outcrop line near Wightman Street. By this time the newly-built Hobart Street had been ruined and traffic over it was impossible.

It was again believed that the fire was under control and that while it would continue to burn for some time, it would eventually burn itself out and no further damage to property would result. About this time the property owners on the north realized that at some future time a new street would have to be constructed and that it would be approximately fifteen feet lower than the original. They feared that the properties still undamaged by the fire would decrease in value by reason of the new grade and they dreaded the possibility that the fire might start up again and continue its destruction throughout the section. Therefore, in an attempt to again bring the land back to its previous value, a contract was let to strip the coal from the line of the street about 200 ft. northward.

It was believed that the coal stripped when sold would defray the expense of the operation and would at the same time give the desired grade. The shaded area in Fig. 1 shows the extent of the stripping operation to date. In the removal of the underlying coal the clay wall built by the city was broken at several places, one strip for a distance of over two hundred feet being entirely destroyed. However, this incident was of little account, as the area of the burning coal was limited by the fact that the bed had been cut. In the process of stripping, the glowing coals had been approached at several points, but never near enough to cause any delay.

The coal was stripped in a general east and west direction, which was parallel with the line of the fire. The idea was to first assure a barrier before stripping the cover from the coal on the long side of the properties. The stripping progressed without incident until a point had been reached where the clay wall crossed Hobart Street. At this point either one of two things happened, the city claiming one and the property owners the other. Either the steam shovel came into too close contact with the burning coal or the clay wall was not of sufficient thickness to arrest the progress of the fire, for it jumped across the barrier and is at present burning in the area shown in black in Fig. 1.

It can be seen that the entire unburned area is menaced by this small burning patch. Unless this portion is either stripped out at once or a barrier built around

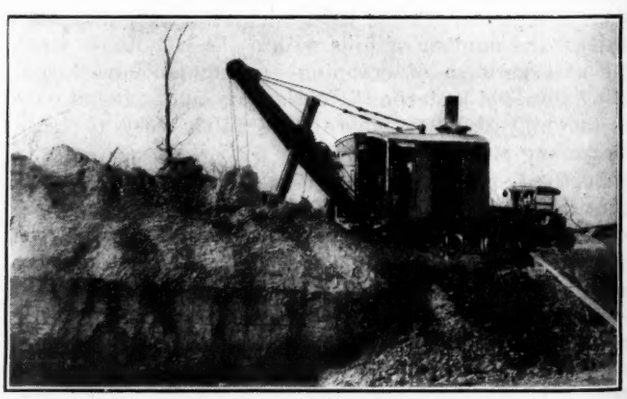


FIG. 5. STRIPPING OVERBURDEN FROM THE COAL

Stripped coal is sold to neighboring householders and other buyers at $1 per ton

FIG. 7. PLEASING SCENE ONLY THREE HUNDRED FEET AWAY FROM THE FIRE
General view along Wightman St., showing the type of residences in the vicinity of the burning coal seam. These also will be in danger should the fire extend.

it, the coal as far as the outcrop line on Beacon Street is liable to fire through an encircling movement. It is difficult to say whether or not live coals were thrown by the steam shovel on the opposite side of the barrier at the now burning point. There are arguments and possibilities on both sides.

It is entirely possible that the clay wall built by the city did not serve its purpose. It has often been proved in large mine fires that a barrier of this thickness is of little assistance, and especially might this apply here where the coal was burning near the surface and could receive plenty of oxygen.

While the first has cost both the city and the property owners thousands of dollars, it has not been without its compensating features, small as they are. For instance, there is no project on foot at present to rebuild Hobart Street, but there undoubtedly will be some time, and when that time arrives the grade that will be given this street will correspond more closely to that of the adjoining thoroughfares than the original.

The illustrations accompanying this article show quite clearly the amount of excavation that has been done as a direct result of the fire and emphasize the importance of care being taken when fires are started on properties that are underlain with coal at a shallow depth or on those that are undermined. It is needless to say that this entire district has suffered as a result of the fire, and that building and general construction have been retarded to a marked degree.

Where coal underlies city properties at shallow depths it seems desirable that it be mined away by stripping. In many cases the expenditure will be more than an insurance; it will be a directly profitable outlay. The market for the coal will be found in the surrounding city. Where the depths at which the coal is found are greater than usual it nevertheless may be financially possible to follow the coal because fear of earlier undermining or future fires may well render the land unsalable.

Those who have noted the surface caves in the anthracite region and the fire area at Carbondale will realize what a loss to property can be caused when the underpinning is removed by excavation or a fire, especially the latter.

Extensive use of steam shovels where towns are underlaid with coal beds would do much to insure them against future trouble. The damage done to the property by a burning coal bed is not merely local, for the sulphur gases spread their pungent odors over the surrounding district, subjecting the town in which they are present to the criticism of every visiting stranger.

Labor Unrest Manifested in the Belgian Coal Industry

A REVIEW of the Belgian coal industry for 1919, published in the *Board of Trade Journal* (London) for Feb. 19, 1920, according to the *Monthly Labor Review*, issued by the U. S. Department of Labor, reveals the existence of a considerable amount of industrial unrest. During the first half of the year thirty-six strikes involving seventy pits and 16,000 workers occurred. To deal with this unrest *Commissions de Conciliation* were established in various mining localities and *Commissions Régionales Mixtes* for larger districts.

These commissions, consisting of representatives of operators and men, in an effort to settle existing disputes, established the principle of an 8½-hour day from June 1, 1919, and an 8-hour day from Dec. 1, 1919, for pit workers, and a 9-hour day from June 1, 1919, for surface workers, and endeavored to settle other minor trouble-producing matters.

Notwithstanding their efforts, however, a serious strike occurred at Charleroi Dec. 15, 1919. The strike, which was declared contrary to the advice of the labor leaders, was due to two causes: (1) The enormous profits of the colliery owners, from which the workers felt that they had not correspondingly benefited; (2) the unsatisfactory operation of the *Commissions Mixtes* due to "the procrastinating attitude of the miners' representatives and the absence of legal sanction for the decision of the commissions."

The men claimed (1) either a wage increase or State control of owners' profits; (2) a definition of the 8-hour day for pit workers and an 8½-hour day for surface workers, which should include time spent in descending and ascending, meals, etc.; (3) a pension of 2 fr. (38.6c., par) per day; (4) an improved system of health insurance.

Through the intervention of the Ministry of Industry a settlement was reached Dec. 20, 1919, in which the miners were guaranteed ("under protest from the owners") a wage increase of 2.50 fr. (48.3c., par) per day, the other disputed questions being left to further discussion by the commissions and final settlement through proper legislation.

Revolving Kiln for Making Lignite Into Made-to-Order Fuel

Thirty Per Cent of the United States Coal Is Lignite and Most of It Is Found in States Having Cold Climates—Experiments Appear to Show That a Revolving Kiln Can Be So Regulated as to Deliver Any Given Type of Fuel at the Pleasure of the Manipulator

By E. L. Broome
49 Wall St., New York City

IT IS stated upon the highest authority[1] that the minable coal resources of the United States amount to over 3½ trillion short tons, of which 30 per cent is lignite. Of this lignite over 90 per cent is in North and South Dakota and Montana. Into the territory surrounding the Dakota lignite deposits there are shipped annually over two million tons of bituminous coal and over one million tons of anthracite. During the year 1917 less than 650,000 tons of lignite were mined in North and South Dakota.[2]

Gas containing 13 per cent hydrogen and 11.6 per cent carbon monoxide is formed while volatile matter is reduced to 11.3 per cent. By varying speed of rotation, fuel feed, steam-air ratio and proportions to coal, the product can be modified to suit market for semi-coke, gas and byproducts. A percentage of the ash passes off as flue dust.

The utilization of lignite to supply the fuel requirements of the sections adjacent to the deposits would result in a saving of over $10,000,000 per year, estimated on the conservative differential of $4 per equivalent fuel ton. Furthermore, "an annual saving would be effected of $4,800,000 in freight charges alone . . . also . . . the travel of 50,000 cars and 1,200 engines and crews a distance of 600 miles."[3]

In view of the existing fuel stringency and the unprecedented shortage of the means of transportation, it seems reprehensible indifference on the part of the authorities of the states affected, if not on the part of the National Government, that means have not been found for meeting the fuel requirements of the lignite territories by commercial development of their underlying fuel deposits.

It must be admitted that prior to the outbreak of the Great War there was no considerable incentive to the exploitation of lignite as a substitute for other industrial and domestic fuels. On a thermal-cost basis lignite as available did not compare favorably with fuels brought in from the outside.

Lignite as mined is a poor fuel, averaging 7,500 B.t.u. per pound in thermal value. The moisture content is high, in some samples over 35 per cent, and in the Dakota deposits it will average over 25 per cent.

Owing to its high volatile content, lignite when thoroughly dried and pulverized makes a powdered fuel that compares favorably with bituminous coal. It also can be mixed to a proportion of 30 per cent with fuel oil[3]. The cost of drying and pulverizing is at present large and this fact offsets in great degree the value of powdered lignite as fuel except when it is used on a large scale at the collieries.

To some extent raw lignite is used on traveling chain grates for power purposes. It has found some application in producers for internal combustion engines and furnace work[3] and also for domestic purposes in special forms of furnaces or stoves,[4] but owing to the expense of transporting the moisture, it will not in its raw state be a formidable competitor of other fuels for some time to come except in the vicinity of the place where it is mined.

At the present time the most promising method of popularizing the immense lignite resources is by a large scale manufacture of briquets in plants located at the collieries. The manufacture of briquets from lignite has passed the experimental stage. Perfectly sound briquets can be made, that will stand handling and transportation well and are practically equal in thermal value to anthracite coal.[5]

During the years 1913 and 1914 a series of experiments were conducted on a commercial scale under my observation with a novel type of continuous rotary gas producer. These experiments, which were interrupted by conditions arising from the advent of the war, have been revived since and it is hoped that the results will soon be ready for publication. The principal object of the experiments was the development of a producer for the utilization of low-grade fuels and waste material such as waste wood and sawdust, peat, lignite, bituminous screenings, anthracite washery waste and bone, etc.

About the time these experiments were going on, attention was called to Dr. Babcock's report[6] on his investigations of lignite for briquetting, with the result that an experiment was made on this substance. This trial was unfortunately short because of a lack of sufficient fuel. It had as its major object the recovery from lignite of a residue suitable for making up into briquets, also incidentally fuel gas and byproducts.

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[1]Campbell: "The Coal Fields of the United States." U. S. Geological Survey, Professional Paper 100, 1917.

[2]Darling: "Notes on Lignite, Its Characteristics and Utilization." U. S. Bureau of Mines, Technical Paper 178, p. 3.

[3]Philips: "The Use of Producer Gas in Texas." University of Texas Bulletin 189, pp. 59, 60, 61.

[4]Kreisinger, Augustine and Harpster: "Combustion Experiments with North Dakota Lignite." U. S. Bureau of Mines Technical Paper 207, p. 36.

[5]Babcock: "Economic Methods of Utilizing Western Lignite." U. S. Bureau of Mines Bulletin 89, p. 49 *et. seq.*

[6]Babcock: "Investigations of Lignite Coal Relative to the Production of Gas and Briquets." University of North Dakota Report of the School of Mines.

LOG OF TEST

Length of test,	9 hr.
Fuel per hour, as fires,	1 090 lb.
Fuel per hour, moisture free,	804.30 lb.
Gas per hour,	18,000 cu.ft.
Gas per hour per lb. of fuel as fired,	16.50 cu.ft.
Thermal value of gas per cu.ft. (calculated from analysis)	145 B.t.u.
Product per hour, moisture free,	310 lb.

AVERAGE ANALYSIS OF GAS

Gas	Percentage	Gas	Percentage
Carbon Dioxide	10.6	Carried forward	25.7
Ethylene	0.3	Methane	5.2
Oxygen	3.2	Hydrogen	13.0
Carbon Monoxide	11.6	Nitrogen	56.1
			100.0

PROXIMATE ANALYSES

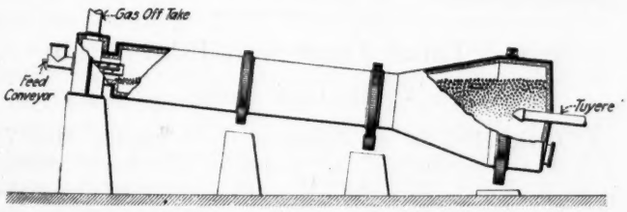
Original Condition			Moisture Free	
Lignite	Product		Lignite	Product
26.2 per cent	26.8 per cent*	Moisture	.... per cent	.... per cent
30.8 per cent	8.3 per cent	Volatile matter	41.8 per cent	11.3 per cent
28.4 per cent	46.6 per cent	Fixed carbon	38.50 per cent	63.7 per cent
14.6 per cent	18.3 per cent	Ash	19.70 per cent	25.0 per cent
7665	7785	B.t.u.	10,387	10 635

* Product collected in water tank.

HEAT BALANCE

Heat in fuel as fired per hour 1,090 × 7.665 B.t.u.	= 8,354 850 B.t.u.
Heat residue per hour 310 × 10,635 B.t.u.	= 3,296,850 B.t.u.
Heat gas per hour 18,000 × 145 B.t.u. = 2,650,000 B.t.u.	5,906.850 B.t.u.
Heat used in process and lost	2,448,000 B.t.u.

The apparatus used in all the experimental work is shown diagramatically in the accompanying illustration. It consisted briefly of a slightly inclined drum, revolving upon rollers and driven through gearing. The drum was lined with fire brick. The fuel treated was fed through the screw conveyor at the left and fell freely upon the interior surface of the firebrick-lined drum. Thence, because of the inclination and revolution, it was slowly transported to the right until it reached the zone of gasification, where it came into contact with a mixture of air and steam introduced through the tuyere shown at the right. During this movement the fuel was slowly heated, deprived successively of its moisture and the lighter and heavier volatile byproducts, each at its critical temperature; finally after a portion of the carbon content had been completely gasified to furnish the heat required for distillation and losses, it was discharged, a determined amount at each revolution in the form of a finely comminuted product composed of carbon and ash and a small content of volatile matter. It will be understood that the plan is merely diagrammatic, the details of the apparatus being somewhat different from that shown in the illustration.



KILN IN WHICH LIGNITE IS CHARRED

Note the resemblance of this apparatus to the ordinary cement kiln. The arrangement of tuyere, feed, and gas exit are here shown.

The gas produced was taken off at the left and passed through a condenser and scrubber and to get rid of it was finally burned. There were no means of determining the quantity or the composition of the condensate. It consisted principally of a copious, dark greenish black tar of a consistency resembling heavy cream. I wish to merely assert my belief that the gradual method of heating and the low temperature of the offgoing gas should assure a maximum of recoverable ammonia compounds, oils and tar; much more dilute, of course, than would be the case in the strict distillation method and requiring more condenser capacity.

It is not claimed that the data given are exact; the short period of time covered by the recorded observation precludes accuracy. The case is cited and the figures given in the hope that they will provoke discussion and inquiry and thereby bring out the experience of other more thorough investigators.

The fuel used was furnished through the courtesy of the Sheridan Coal Co., of Omaha, Neb., and came from its Dietz (Wyo.) No. 4 mine. It was of the grade known as slack or screenings and was quoted in 1914 at 25c. or less per ton f.o.b. mines.

The fuel used was higher in ash than would be employed for the production of briquets. This grade might be used in a producer to furnish gas for the process. It may be remarked that the quantity of ash in the original fuel is not accounted for in the residue. While this is accidental, it was found that a considerable portion of the ash was carried out as dust with the gas; as well as some of the combustible. How much of either thus escaped is not known, but a sample of flue dust analyzed as follows:— Moisture 2 per cent, volatile 15.3 per cent, fixed carbon 44 and ash 38.7 per cent.

Evidently more carbon was burned and more noncondensible gas was produced than necessary or permissible if the carbonized product were the principal object. It should be noted that a device of this character has *per se* a number of ready variables—the speed of rotation, the quantity of fuel fed, the quantity and relative proportions of steam and air, while within certain limits the temperatures are controllable and, perhaps what is more important, the process is continuous.

Let us suppose that the original fuel available for a test was equal to the average of North Dakota lignites, viz.: Moisture, 27.13 per cent; volatile, 29.11; fixed carbon, 36.16; ash, 7.6.[7] Figuring the reduction ratios as demonstrated, from 2,000 lb. of raw lignite we should have recovered 600 lb. of product of about the following proximate analysis: Volatile 10.17 per cent, fixed carbon 77.2, ash 12.67 and having a thermal value probably of more than 12,500 B.t.u. per pound.

For comparison, Babcock[8] reports with his modified beehive ovens an average recovery in products of 47.3 per cent by weight with an average analysis of:— volatile 16.66 per cent, fixed carbon 73.73 per cent, ash 9.61 per cent, and a calorific value per pound of 12,749 B.t.u.

An apparatus of the type illustrated may be readily adapted to meet the demands of market changes with practically no alteration or delay. If the market for fuel gas was strong in a particular locality the fuel could be completely gasified[9] with the recovery of byproducts as is done in the Mond process. If the gas demand was variable, residue for briquets could be produced and stored during periods of low demand for gas. If there was no local market for gas it could be used to furnish heat for the carbonizing process and probably very little, if any carbon would be burned.

Without question in the near future, the decreasing supply of anthracite coal will be so restricted that the price will be prohibitive for power or domestic purposes. The only practical relief will be the artificial prepara-

[7] Darling: "Notes on Lignite"; p. 2.
[8] Babcock: "Economic Method of Utilizing Western Lignite," p. 44.
[9] The apparatus has since been perfected as a producer to discharge ash containing less than 5 per cent combustible.

tion of fuel from high-volatile coals. The German Government has imposed a surtax of 20 per cent ad valorem upon all coal which is not distilled or treated for its byproducts.[10]

"It is not beyond the bounds of reason to forsee a condition whereby a householder in the place of his ton of anthracite which he now welcomes for $11, will receive a ton of smokeless coal without slate, a month's supply of cooking gas, 40 miles of motor fuel, enough fertilizer to start a small garden, and tar sufficient to allay the dust in front of his house—all for far less money than he now pays for inferior coal." [11]

Worldwide British Oil Bunkering Stations To Be Established*

Conversion of Shipping to Oil Fuel Has Created a Problem of How to Keep Ships Supplied with Bunkers. Here is the British Answer

A LARGE British oil bunkering company, backed by powerful interests, is being formed to supply fuel to oil-burning ships at bunkering stations throughout the world.

The chairman of the new company will be Lord Inchape, who is a director of the Anglo-Persian Oil Co. The board also will include Sir Charles Greenway, chairman of the Anglo-Persian Oil Company, and Sir Frederick Black, who acted for the British Government in the United States during the war in connection with oil. Messrs. William Cory & Son, Ltd., will act as selling agents, and will be in a favorable position to prepare for the supply of oil fuel to ships at stations throughout the world, through its own organization and the arrangements of the coaling firms it controls.

While the reduction in the price of British bunker coals has brought a certain amount of relief to shippers, the problem of securing a sufficient supply of oil fuel for British ships has become acute, and is likely to become more so as vessels fitted for burning oil fuel leave the builders' yards in increasing numbers. In many important ports in the East supplies of oil fuel are reported to be unprocurable.

From the British point of view, the position is rendered still more serious by the merchant marine of the United States, which, being largely oil-driven, will be a heavy user of existing supplies. It is reported that highly efficient arrangements have been made for the American ships, as a result of which they have been able to obtain supplies at Rotterdam at a price equivalent to 56s. a ton, whereas British ships were quoted a price of 200s. a ton.

The new British company is said to be assured of supplies of oil in the East, and will, no doubt, be able to strengthen its position in other directions. The capital will be £1,200,000, but no public issue is expected, the necessary funds being found by the interests forming the company.

The Anglo-Persian Oil Co. is erecting large oil refineries and storage tanks near Swansea, with the object of making this the distributing center for the West of England.

The crude oil will arrive at Swansea port from the Persian oil ports in the tank steamers of the company, will be pumped direct by means of pipe lines laid from the steamer holds to the refineries, and thence back again for distribution after treatment. The oil will not be touched by hand throughout the whole process.

The site covers 400 acres of what was formerly waste land and an entirely new community will be built up.

All the principal ports are now giving special attention to the question of oil storage and facilities for bunkering ships with liquid fuel, for the use of which so many vessels are now being fitted. At Liverpool a large area of land at the extreme south end of the dock estate is being allocated for this purpose and loading and discharging jetties are being built and pipe lines laid.

At Bristol, too, the Corporation, which owns the docks is extending the oil basin at Avonmouth at a cost of £150,000, which will result in an additional 500 feet of quay space being available.

Incessant chaos in the coal industry is one of the chief factors turning the thoughts of shippers to ways and means of dispensing with coal, and for this reason the transfer to oil fuel is receiving great impetus.

On March 20 it was announced that, by agreement between the South Wales Coalowners' Association and the Government, the price of bunker coal would be reduced on and after April 1 from 100s.-115s. to 75s per ton. The reduction, however, came too late to forestall the increase in outward freights, which it was known several British shipping lines had been contemplating.

The Booth Steamship Co., in addition, has since issued a circular to shippers to the effect that it is compelled to increase the existing surcharge of 33⅓ per cent to 50 per cent on outward freights to North Brazil and Iquitos.

The Booth line, the position of which is typical of many others, has suffered severely by the loss of passenger vessels during the war, and has now only two passenger ships left in the service. It has also been seriously affected by the decline in coal exports, as before the war the cargo vessels of the line carried large cargos of coal to Brazil. At the present time practically two out of every three of its steamers leave Great Britain in ballast.

British Labor Leaders to Take Action To Reduce Costs

ACCORDING to a cablegram from London May 7, *The Commercial and Financial Chronicle* states, British labor leaders are gradually coming to a realization that by demanding continued advances in wages and concessions in working conditions they are in reality bringing disaster upon themselves.

The statement was made that the "Executive of the 'Triple Alliance' of the miners and transport workers, which is now in session in London, has embarked upon a determined effort to break the vicious circle of wages and increases in the cost of living." It was added that members of the Alliance discussed this question and that "they will meet again at an early date to receive the report of the joint body, and their views will be submitted to the Government with a view to the latter taking 'such action as will substantially reduce present high costs.'"

[10]Darling: "Notes on Lignite," p. 5.
[11]Gilbert and Pogue: "Coal—The Resource and Its Full Utilization." U. S. National Museum Bulletin 104, part 2, 1918; p. 15.
*From *Anglo-American Trade*. At normal exchange rates a penny is equal to 2.029c., a shilling is worth 24.35c., and a pound $4.8665.

Coal Is Saved by Automatic Regulation of Fire to Accord with Steam Used

To Secure Efficient Combustion of Coal the Amount of Air Admitted and Coal Supplied Should Be So Regulated Automatically That They May Be in Proper Proportion to Each Other and to the Amount of Steam Used, the Steam Pressure and the Depth of Fuel Bed

By T. A. Peebles*
Pittsburgh, Pa.

EVEN for the mine operator and manager the efficient combustion of fuel is an important problem. The cost of producing coal is high and there are indications that the limit has not yet been reached. It is true, transportation and labor conditions rarely restrict coal supply at mines, yet it is more necessary than ever to reduce the consumption of coal, for all the coal produced, large or small, can now be disposed of at a good figure, and the good coal used at the mine reduces by that amount the part of the output that can be sold, while the miner has to be paid for what he has mined whether the coal be consumed at the plant or shipped to the market.

Provision can be made that just as soon as the quantity of steam used is increased more air will be admitted and the fire briskened, while the grate will take on more fuel. Low pressure will have the same effect. As a result coal will not be wasted at the safety valve, nor will the pressure fall below what is needed.

The requirements for efficient combustion are so well known that they need not be repeated here. Automatic apparatus has been developed for mechanically supplying fuel to various types of furnaces and the labor involved has been reduced to a small fraction of that required for hand firing. The method of introducing both fuel and air to the furnace also has been materially improved, so that it is possible to insure that the proper quantities of both will be introduced continuously. This is a condition highly desirable from the standpoint of efficient combustion.

In order to meet changing load conditions it is necessary to regulate the fuel and air supply in accordance with the demand. Since it is absolutely indispensable to the highest efficiency that the correct relation between the fuel and air supply be continuously secured it is important that simple and effective means be provided whereby this relation may be established and maintained. Unfortunately for the development of fuel-burning apparatus, whether it be stokers for use with coal, oil burners or gas burners, the means for properly regulating the fuel and air supply has not been considered a part of the fuel-burning apparatus itself. It is, therefore, necessary that the control of fuel and air supply be effected manually or by means of some device that is not an integral part of the firing apparatus.

Since the amount of fuel and air that must be supplied depends upon the weight of the load being carried, it is apparent that the ideal method of control would consist of apparatus that would automatically control the influx of fuel and air in accordance with the demand. This would be determined by the amount of steam being used rather than by the pressure at which it was generated. In boiler plants where a careful study of combustion control has been made a method has been developed whereby regulation in accordance with the demand on the boilers is working satisfactorily.

The damper-operating levers, and the fan- and stoker-controlling devices are located at a convenient point, with the steam-flow meters and draft gages so mounted that the fireman can observe from these instruments the effect of each adjustment made. By observing the flow meter the fireman is able to determine the demand on the boiler, and by means of a large pilot gage he is informed immediately of any change in steam pressure. He is therefore able to make the necessary adjustments to meet the demand for steam and maintain a practically uniform pressure.

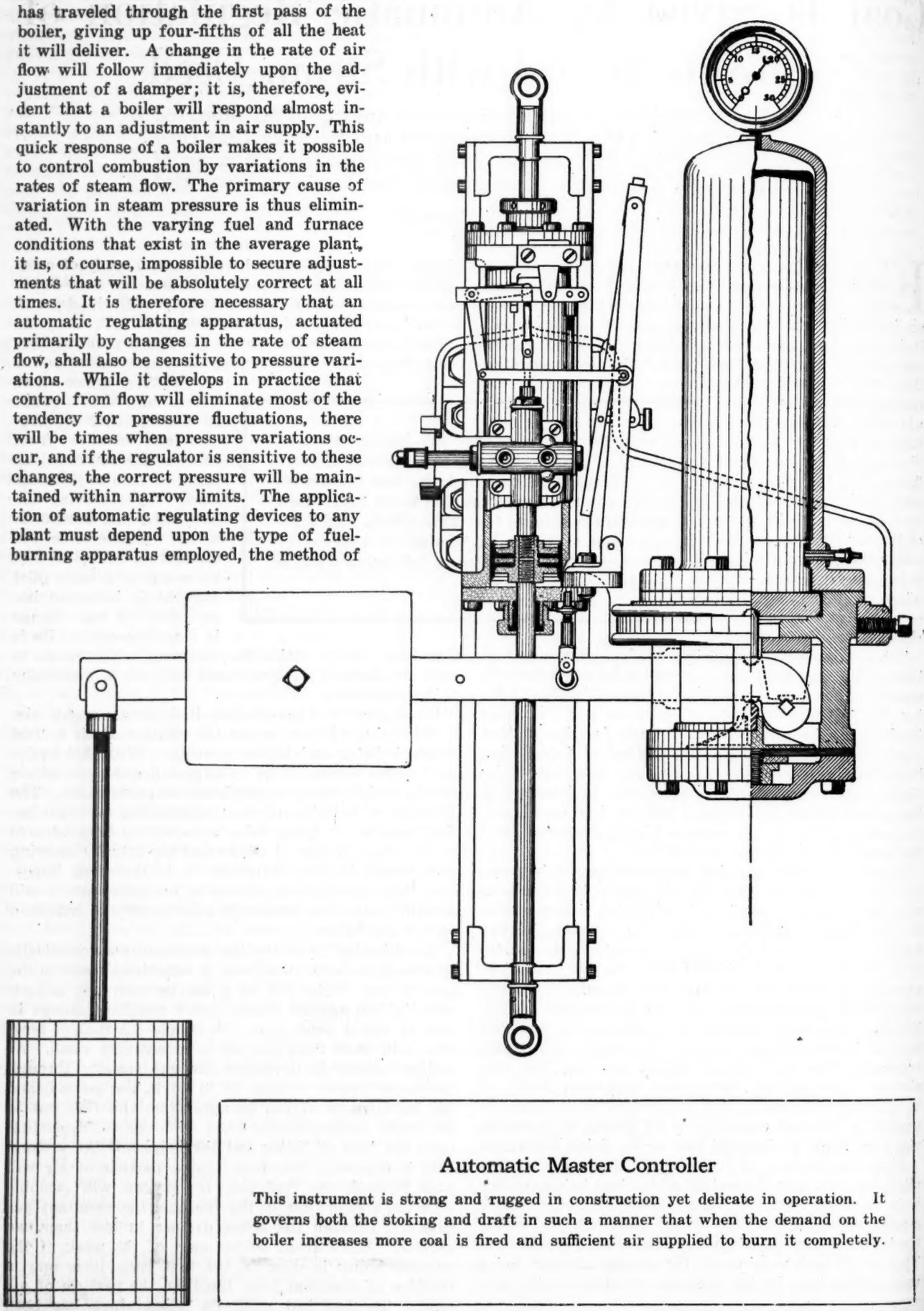
Draft gages and gas-analysis instruments enable him to determine whether or not the relation of air to fuel supply is being maintained correctly. With this equipment at his command the intelligent fireman can secure results which closely approximate test efficiencies. The difficulty of building up and maintaining an organization capable of doing this, however, is demonstrated by the small number of plants that are actually securing such results in daily operation. It is, therefore, important that automatic apparatus be developed which will actually make the necessary adjustments to maintain correct conditions.

An objection to controlling combustion automatically in accordance with steam flow is sometimes made on the ground that there will be a lag between any adjustment in fuel and air supply, and a resultant change in rate of steam generation. A simple calculation, however, will show that this lag is exceedingly small. At ratings commonly developed the gas velocity through the boiler passes is from 30 to 40 ft. per second, and the total length of gas passage from the fuel bed to the boiler damper varies from 40 to 80 ft., depending upon the type of boiler and the height of the setting.

It is apparent, therefore, that a particle of air will pass through the fuel bed, its oxygen will combine with the combustible in the fuel and the resultant gas pass out through the boiler damper in less than two seconds. Since about 80 per cent of the work of the average boiler is done in the first pass, it is only a fraction of a second from the time the particle of air enters the fuel bed until its temperature has been

*Combustion Engineering Corporation.

increased to that of the furnace and the gas has traveled through the first pass of the boiler, giving up four-fifths of all the heat it will deliver. A change in the rate of air flow will follow immediately upon the adjustment of a damper; it is, therefore, evident that a boiler will respond almost instantly to an adjustment in air supply. This quick response of a boiler makes it possible to control combustion by variations in the rates of steam flow. The primary cause of variation in steam pressure is thus eliminated. With the varying fuel and furnace conditions that exist in the average plant, it is, of course, impossible to secure adjustments that will be absolutely correct at all times. It is therefore necessary that an automatic regulating apparatus, actuated primarily by changes in the rate of steam flow, shall also be sensitive to pressure variations. While it develops in practice that control from flow will eliminate most of the tendency for pressure fluctuations, there will be times when pressure variations occur, and if the regulator is sensitive to these changes, the correct pressure will be maintained within narrow limits. The application of automatic regulating devices to any plant must depend upon the type of fuel-burning apparatus employed, the method of



Automatic Master Controller

This instrument is strong and rugged in construction yet delicate in operation. It governs both the stoking and draft in such a manner that when the demand on the boiler increases more coal is fired and sufficient air supplied to burn it completely.

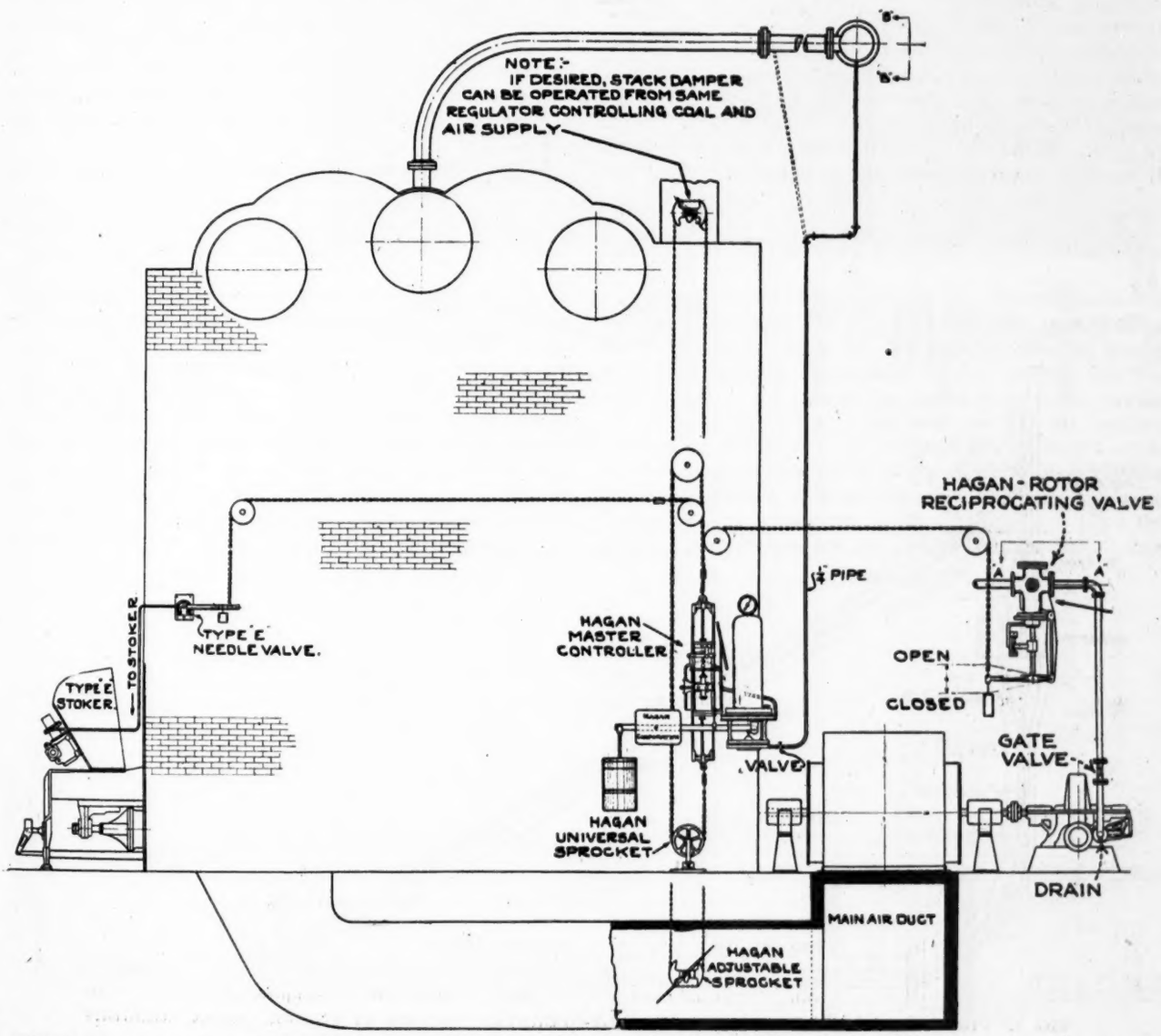
producing draft and the local conditions as to load and fuel. The personnel and organization of the plant force also are important. In large installations, where a well-trained operating organization is available, it is desirable to consider each boiler as an individual unit and equip it completely with its own automatic control, including that of fuel and air supply and the discharge of the products of combustion. With an arrangement of this kind the apparatus can be made responsive not only to steam-demand and pressure variations but also to the condition of the individual fuel bed, and no hand adjustment or manipulation will be necessary. This type of control will give the best possible results, but is not always the most adaptable to the smaller installations, where a simpler arrangement would be preferable.

Such an arrangement would automatically control the supply of fuel and air in accordance with the variations in steam flow and pressure, all boilers in service being governed from one main regulator.

If a large number of small units are in operation, it may be desirable for the purpose of control to divide the plant into two or more groups and install a separate regulator on each group. With this arrangement each boiler of a given group will receive the same fuel and air supply as each of the other units, and there will be no tendency for the fires to become too heavy under some boilers and too light under others, except when variations in fuel occur. This happens at times, but it is not a serious matter, and can be corrected by simple hand adjustment when necessary. Control of this kind will give results closely approximating those secured from the more complete system. It has the advantage, in many plants, of simplicity and low cost of operation.

Plant operators are confronted with the fact that it is impossible to secure the right kind of labor to operate a boiler plant efficiently by hand methods, and are coming to realize the necessity of a correct system of automatic regulation. The problem must be carefully studied, due attention being paid to equipment and local conditions as well as the type of control selected, which should be best suited to the existing conditions.

F. H. Crawford, a mining engineer, who has been specializing in coal problems for the Bureau of Mines, has resigned to enter private employment.



ARRANGEMENT OF CONTROL WHEN FITTED TO A STIRLING BOILER

The master controller governs the draft and stack dampers as well as the steam supply to the fan turbine and the stoker.

Labor-Saving Methods of Handling Cars At Anthracite Shaft Stations

Two Types of Shaft Stations at One Shaft, One Operated in Part Mechanically and the Other Wholly by Gravity—Only Two Men Required to Handle the Cars—Simple Arrangement of Dogs to Prevent Cars from Running Away

BY DEVER C. ASHMEAD
Tarrytown, N. Y.

AT THE main hoisting shaft of the Silver Creek colliery of the Philadelphia & Reading Coal & Iron Co., near New Philadelphia, Pa., are two shaft stations of simple design that really require only two men to operate them. They are of entirely different design, one being mechanically operated while the other operates entirely by gravity.

The plan of the first or mechanically-operated shaft station is shown in Fig. 1. At this point both of the tunnels and the shaft itself are entirely in rock. Mine locomotives which in this case happen to be of the compressed-air type place the loaded mine cars on the loaded track so that the first car of the trip can be reached by the pusher. This loaded track is, as stated, in a rock tunnel and is 323 ft. long and perfectly level. If some of the cars from the previous trip have not been sent to the surface and are standing on the loaded track, then the new trip of loaded cars is coupled to those remaining.

The pusher is nothing but a long cylinder and piston operated by compressed air. It can be seen in Fig. 2 pushing a mine car. The end of the piston rod of the pusher is so arranged that it will engage the axle of the mine car and when the air is admitted to the cylinder the piston will be pushed out, driving the cars forward. The travel of the pusher is 12 ft. It causes a forward movement of the trip of equal length. It is so located that when the cars are pushed forward to their maximum distance, the first car stands on a grade of 3 per cent and is at a distance of 30 ft. from the shaft.

When it is desired to load one of the mine cars on the

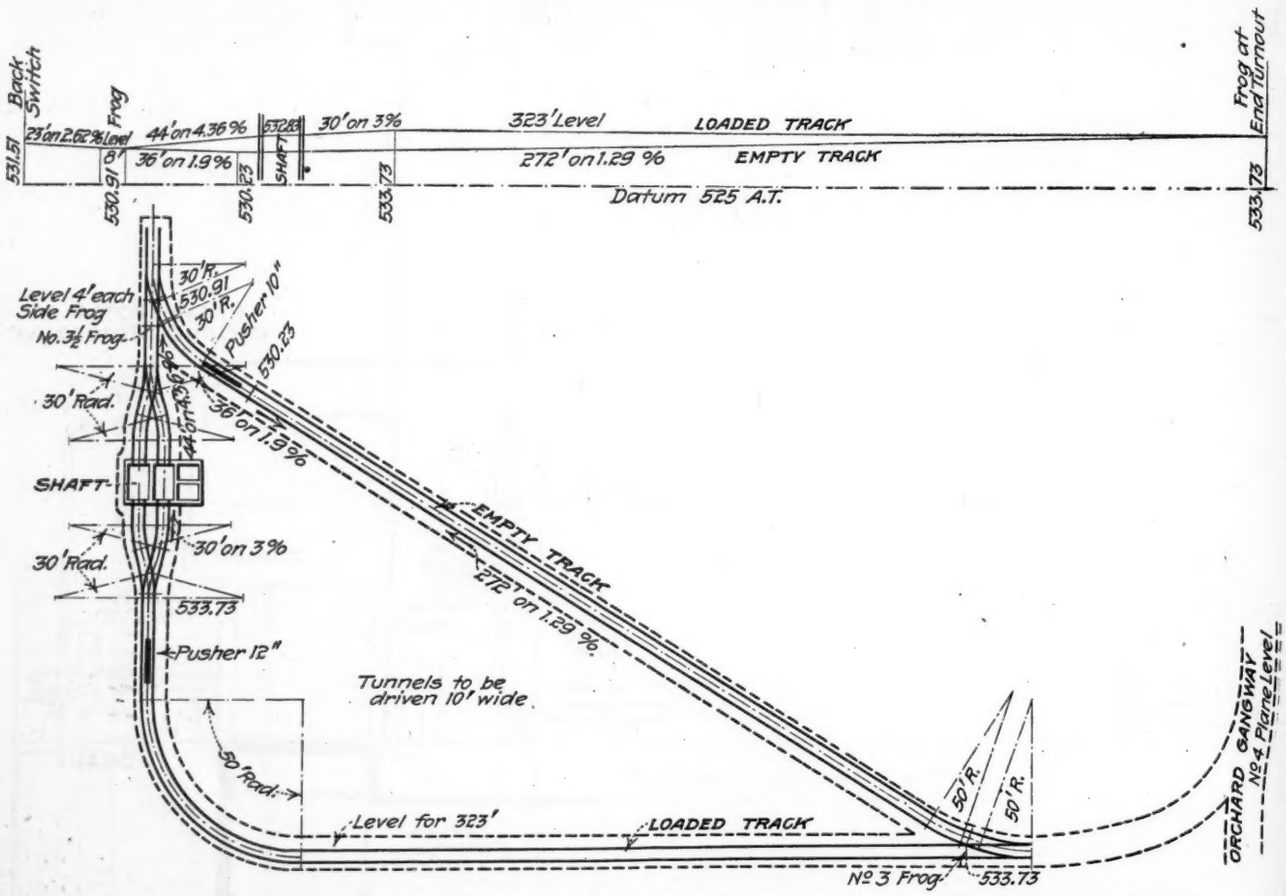


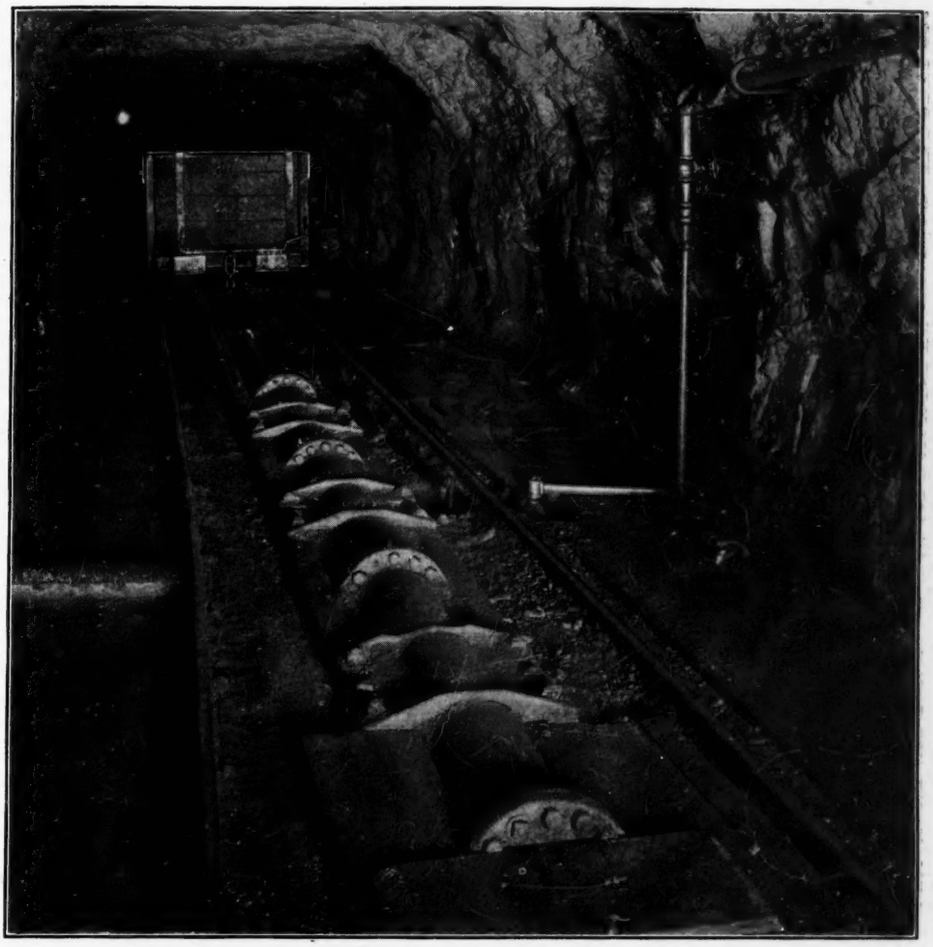
FIG. 1. PLAN AND PROFILE OF MECHANICALLY-OPERATED BOTTOM AT SILVER CREEK COLLIERY

Only two men are required to operate this bottom, one at each car pusher. Two compartments of the shaft are used for hoisting coal while the other two are employed for hoisting water.

FIG. 2

Compressed-Air Car Pusher

The cylinder is 12 ft. long and the device handles the empty cars as they come from the kick-back. The control apparatus, governing the movement of the piston in the cylinder, may be plainly seen in the air pipe near the right-hand rib.



cage the first and second car are uncoupled from each other and in consequence the first car, which is standing on a 3-per cent grade, moves forward by gravity and runs onto the cage, kicking off the empty mine car which is standing there. The empty car then passes down a 4.36-per cent grade to a kick-back, which throws the car onto the empty-car track. For a distance of 36 ft. this track is on a down grade of 1.9 per cent, but it changes at the end of that distance to a 1.29-per cent grade against the empties. After rising on this grade for 272 ft. it joins with the loaded track.

Sufficient speed is given to the car when it leaves the kick-back to carry the car past the end of a pusher for empty cars located at the point of changed grade. Fig. 2 is really a photograph of this pusher, but the one pusher which moves the loaded cars is of exactly the same construction. As soon as the car reaches the end of the pusher it is pushed up the slight grade until it is close enough to couple it with the preceding car. A sufficient number of empty cars are spragged to prevent the empty cars from running back down the grade. As the cars are coupled to one another as fast

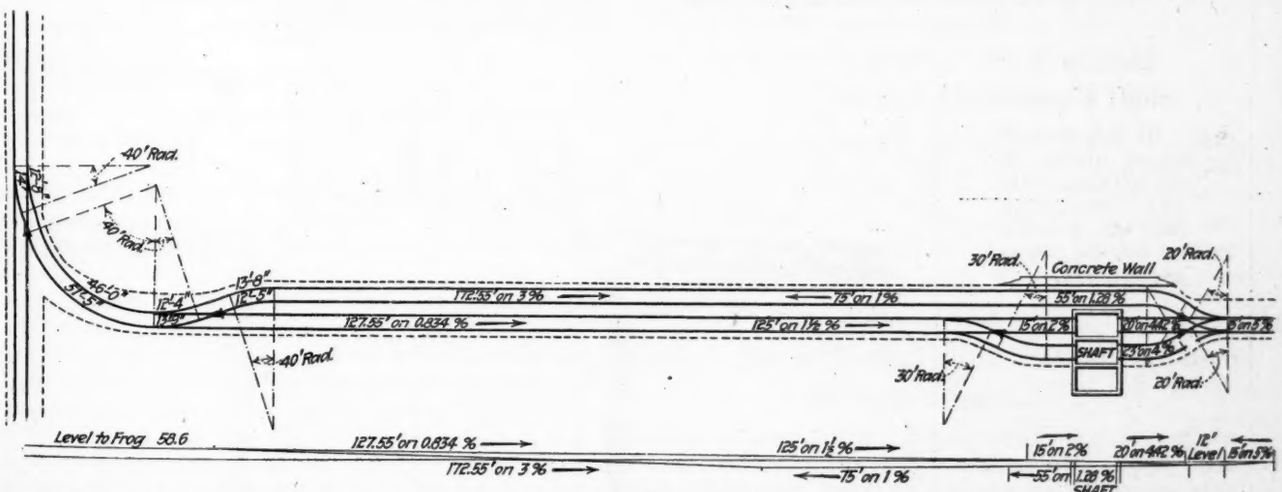


FIG. 3. PLAN AND PROFILE OF THE GRAVITY-OPERATED SHAFT BOTTOM, ALSO AT SILVER CREEK MINE

This bottom, like that illustrated, is operated by two men. The bottom is so laid out that the cars travel by gravity only, without the aid of any mechanical equipment whatever.

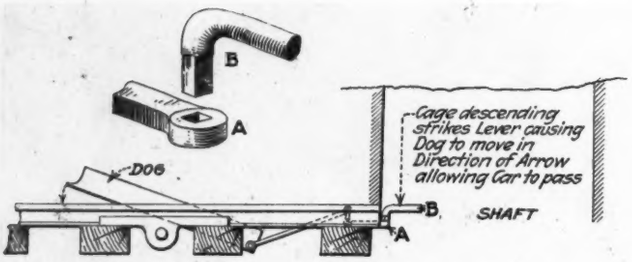


FIG. 4. CAGE-OPERATED CAR STOP OR DOG

as they arrive they are ready for coupling to the mine locomotive. Hence they can be hauled to the mine workings without further delay. Just enough sprags are used to keep the cars from moving back by gravity, but not enough to have any great effect on the pusher.

Two men are all that are necessary to operate this shaft station. One of these is located at the pusher on the loaded side of the shaft. He operates the pusher by a lever and uncouples the cars, releasing them one by one so that they can pass by gravity to the cage. He also operates the switch which turns the cars to the different compartments of the shaft. Another man is required on the empty side of the shaft. He operates the pusher at this point and also couples and sprags the mine cars. Although only two men are required to operate this shaft station the coal company uses four, as the shaft station on the bottom level is not as easily operated and requires the extra men, the same crew operating all of the stations in the shaft.

The second type of shaft station is at the No. 3 plane level of the same shaft. This shaft station is operated entirely by gravity and is entirely different from the one that has just been described. Instead of using separate tunnels for the loaded and the empty tracks both are here in one tunnel which has a double instead of a single track. A single track comes off the main haulage road for a distance of 58 ft. to the point of frog where the double track begins. The loaded track has a grade for the first 127.55 ft. of 0.834 per cent in favor of the loads. This grade then increases and, for the next 125 ft., is 2.5 per cent in favor of the loads. This carries the cars to within 15 ft. of the shaft. The last 15 ft. is a down grade of 2 per cent. This heavy inclination at the end of the loaded track near the cage is planned so as to give the cars sufficient force to kick off the empty car that is standing on the cage.

A compressed-air locomotive delivers the cars to the loaded track and pushes them to a point near the switch to the two cages. A sufficient number of sprags are placed in the wheels to prevent the cars from moving forward by gravity. When it is desired to place a mine car on the cage that car is uncoupled from the trip and the sprag removed and the car is allowed to drop by gravity to the cage on which it is to be loaded. As soon as the empty car has been kicked off the cage by the loaded car it runs down a very steep grade of 4.42 per cent for a distance of 20 ft. and then to a kick-back that has a grade of 5 per cent against the car. This sends the empty car to the empty track, which has, for a distance of 55 ft., a down grade in favor of the empties of 1.28 per cent and for the next 75 ft. a grade of 1 per cent. The next 172.55 ft. of the empty track has a grade of 3 per cent against the empties.

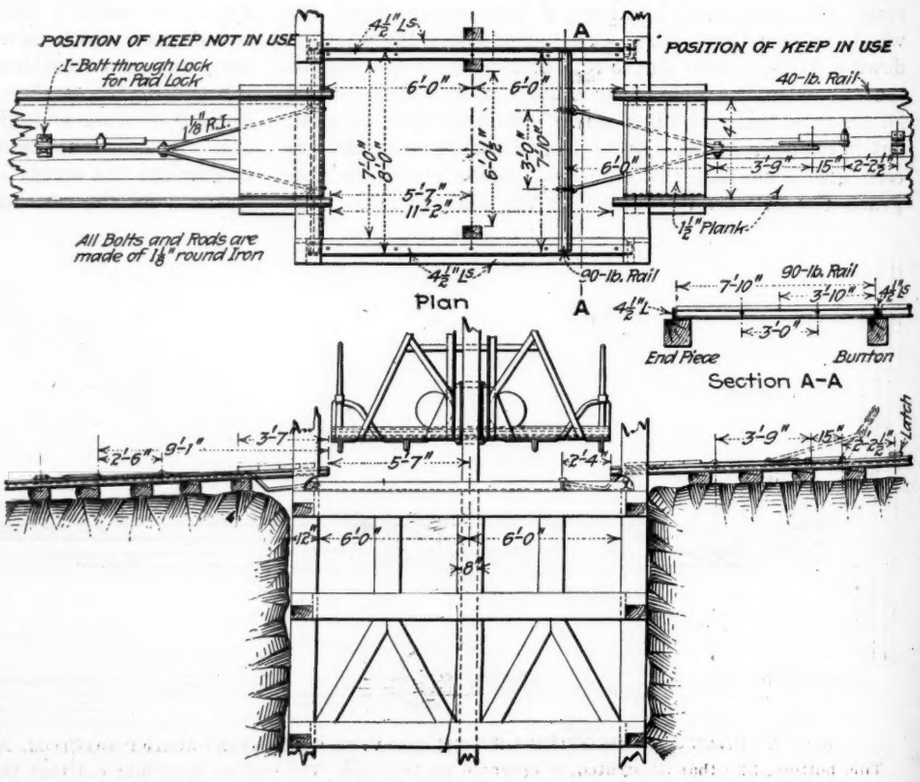
As in the previous case, only two men are required to operate this shaft station. One man tends to the loaded cars, unspragging them and throwing the switch to the cages, while the other man couples the empty cars for the locomotive.

There is a concrete wall between the empty and loaded tracks. The double-track tunnel is 16 ft. wide, whereas the single-track tunnels in the station previ-

FIG. 5

Details of Shaft Keeps

By a system of signal lights in the hoisting room the enginemen can tell whether or not the keeps are in place.



ously described are only 10 ft. wide. Fig. 3 shows the plans of this shaft station in detail.

There are two other features of considerable interest in both these shaft stations. These are the dogs which prevent the mine cars from running away and falling down the shaft, the other is the method in which the keeps are operated. Fig. 4 shows how the dogs are put in and out of commission. When the cage descends it hits the lever marked *A* and this causes the dogs to drop out of sight and allows the car to pass over them and onto the cage.

Fig. 5 shows in detail the construction and the operation of the keeps. These keeps are operated by a lever which is thrown by the station tenders, and when in place for use a light is lit in the hoisting engine room indicating that everything is ready for hoisting.

U. S. Chamber of Commerce Will Study Production Data

SOUND business is evidenced in the new program of the U. S. Chamber of Commerce that calls for the organization of an industrial department to study the problems of the manufacturer with particular reference to raw materials production and the output of fabricated commodities.

This new department will study many of the problems of the manufacturer and will deal with selection and education of employees along efficiency and safety lines, wage or compensation plans, housing, workman's insurance, benefits and pensions, alien labor, Americanization, standardization of products, etc.

E. W. McCullough who has been selected to head the new department, points out that there is a great need of more definite and accurate information as to our resources of basic materials, natural and developed, and also as to the resources of the country—not mere data, but data organized and visualized to meet the needs of the average producer. The same treatment should be given partly fabricated materials, which in many instances are the raw materials of other industries.

In production, according to Mr. McCullough, much benefit of good equipment is lost unless production schedules and accurate cost reckoning are made part of the system. Too much of our industrial output is figured on a gambling basis. The day of estimating and cost-plus methods went with the war; these have been supplanted by competition which measures profits based on cost facts.

The new manager holds there is as great need in most lines for reliable production figures as there is for information concerning markets. An unnecessary surplus in production is an injury to producer and consumer alike; is, in fact, economic waste. Under-production causes starvation and suffering. Both may be avoided as far as manufactured products are concerned, except in times of stress, through the availability of accurate production data.

The majority of industries neither gather nor make statements of correct production, while that furnished annually to the Federal Census Bureau is valuable only for comparison. Up to this time defective records, or total absence of records, together with reluctance, because of competitive reasons, have prevented the gathering of figures which would be the most valuable guide to intelligent production.

The National Chamber offers to business the service of this department together with that of other new departments recently created to help solve its problems.

Commerce Commission Orders Anthracite Roads to Pay Heavy Damages

ON APRIL 6 the Interstate Commerce Commission issued an order directing the Lehigh Valley Railroad Co. to pay G. B. Markle Co. $101,200.60, with interest amounting to $13,538.91, as damages for unreasonable freight charges for carload shipments of anthracite coal from the coal company's collieries since April 1, 1916.

On a similar charge the Lehigh Valley was ordered to pay Pardee Bros. & Co. $30,146.30 with interest amounting to $3,399.79, and to the firm of Charles M. Dodson & Co. $32,509.77 with interest amounting to $3,596.39.

At the same session the commission directed the Central Railroad of New Jersey to pay the Dodson company $7,213.24, as reparation for unreasonable freight charges on anthracite coal shipments.

Winter Wheat Condition Improves

ESTIMATES on winter wheat issued by the Bureau of Crop Estimates May 8 state that on May 1 the area of winter wheat to be harvested was about 34,165,000 acres, or 4,605,000 acres (11.9 per cent) less than the acreage planted last autumn and 15,740,000 acres (31.5 per cent) less than the acreage harvested last year. The ten-year average per cent of abandonment of planted acreage is 11.2. The average condition of winter wheat on May 1 was 79.1, compared with 75.6 on April 1, 100.5 on May 1, 1919, and 87.1, the average for past ten years on May 1.

British Miners Want Share of Increase In Price of Coal

FOLLOWING closely on the announcement of an increase in the price of coal in London from $10 to $13 a ton the coal miners' executive committee called a meeting to discuss the new prices and their relation to mine workers' wages.

When approached on the subject Vernon Hartshorn, labor member of Parliament, said "If prices are going up, the miners' wages are going up as well."

Steel Rail Production for 1919 Showed Decline

STEEL rail production in United States in 1919, according to *The Wall Street Journal*, was 2,203,843 tons as against 2,540,892 tons in 1918, 2,944,161 tons in 1917, 2,854,518 tons in 1916, 2,204,203 in 1915 and 1,945,095 tons in 1914. Since 1903 the largest production in any year was in 1906, when the output was 3,977,887 tons.

Foreign Trade Shows Three Billion Balance In Nine Months

IMPORTS brought into the United States during the nine months ending with March were of a total value of $6,051,000,000, leaving a trade balance for the nine months of $3,332,000,000.

NEWS FROM THE CAPITOL

BY PAUL WOOTON

Canadian Exchange Rates Bother Coal Shippers

IN the near future the Interstate Commerce Commission is expected to announce that the carriers, on their own responsibility, may place a footnote on their Canadian coal tariffs to the effect that if the American proportion of through charges is not paid in the United States currency, exchange should be considered in making payment. The American Wholesale Coal Association requested the Interstate Commerce Commission to issue a ruling to that effect.

The commission is unwilling to authorize such a footnote itself, but it has no objection to the individual carriers taking that action on their own responsibility. It was pointed out that immediate action was imperative on coal, which must move a maximum volume at this season of the year, whereas the same question with regard to general merchandise could be threshed out later.

Private Coal Depots Will Not Be Permitted at Panama Canal

FACILITIES for the storage and handling of coal at the Panama Canal are such that private plants for such purposes will not be permitted. Adequate service for supplying shipping passing through the canal can be had only by obtaining the maximum capacity of Government plants. For that reason Chester Harding, Governor of the Canal Zone, has issued, with the approval of Newton D. Baker, Secretary of War, circular No. 704-3, as follows:

1. Circular No. 703, of July 30, 1915, announced the policy of the Panama Canal, as approved by the Secretary of War, with regard to the establishment of private coal and fuel oil depots on the Ithmus for the supply of shipping passing through the Panama Canal.

2. Pursuant thereto private fuel oil depots have been established and are in operation. Similar action has not, however, been effected in connection with the storage of coal.

3. Experience to date is now accepted as demonstrating the necessity of reversing previous policy with regard to the establishment of private coal deposits. As indicated in Circular No. 703, private wharfage and private utilities for the handling of fuel have, from the first, been recognized as undesirable. This establishment has not at any time been contemplated. So far as concerns fuel oil, the use of existing Government utilities in common connection with both Government and private storage has proved practicable, at least to the extent of justifying further trial. Similar duplicate use of utilities for storage and handling of coal cannot, however, be applied without substantial reduction in the total quantity of coal that can be stored, or without serious interference with the operation of handling. It has been found that proper service demands the maximum capacity of existing plants, and that the factors involved apply with equal force to whatever extensions may hereafter be developed.

4. It is accordingly now announced that, with the approval of the Secretary of War, the policy of the Panama Canal no longer contemplates the establishment of private coal depots in the Canal Zone.

Coal Operators Ask Help for Roads

REPRESENTATIVE ESCH, chairman of the Committee on Interstate and Foreign Commerce of the House, is receiving numerous appeals, many of them from coal operators, urging that an extension of time be granted the railroads for repayment of the amounts due the government.

Under existing conditions the proportion of the carriers' earnings available for repairs and extensions is insufficient to take care of these accounts. As a result the coal industry and other commercial activities are being handicapped because of low car efficiency and inability to secure new sidings and trackage facilities. The hard usage to which all equipment was subjected during the war has caused the proportion of cars in poor condition to be much higher than normal.

Will Divert Coal from Congested Centers

BECAUSE of congestion at tidewater ports and at large railroad centers the Interstate Commerce Commission is considering plans which will tend to divert coal to points where it can be unloaded promptly. Delays to cars resulting from congestion at tidewater and in the large city yards is regarded as an important contributing cause to the car shortage, with a consequent decrease in production. It is stated that too much coal is being loaded to points where it cannot be handled promptly, whereas small towns and the smaller industries could absorb this coal to great advantage and return the cars promptly.

Revenue Officer Addresses Operators on Coal Taxes

INTERNAL Revenue officials are very much pleased with the success of the recent trip of A. W. Gaumer, of that bureau, during which he talked on coal tax matters at a number of meetings of operators. After each address Mr. Gaumer invited those present to ask questions and to point out any inequities in connection with the operation of the revenue laws.

National Coal Association Announces Tentative Program for Convention

A TENTATIVE program for the annual convention of the National Coal Association, which will be held in Atlantic City May 25 to May 27, has been announced.

Tuesday, 10 a.m.—Roll call and reports of officials and committees. Governor J. J. Cornwell of West Virginia will address the convention in the afternoon, after which there will be reports of committees and the election of directors at large. This should be a lively session as a discussion of assigned cars will follow the report of the committee on railroad relations. The special committee on railroad fuel is expected to spring a new scheme for the solution of this problem.

Wednesday morning will be given over to business and an address by Governor Harding of the Federal Reserve Board. Dr. Eaton and A. H. Smith, of the New York Central, will talk on Thursday morning.

Taft Will Be Guest of Coal Jobbers

FORMER President William H. Taft has been invited to be the guest of honor at the banquet which will be a part of the annual convention of the American Wholesale Coal Association to be held in Pittsburgh June 1 and 2. The complete program for the convention has not been completed at this writing, but the following features have been definitely arranged:

William B. Colver, of the Federal Trade Commission, will discuss the function of wholesaling; C. B. Hurrey, of the Bureau of Internal Revenue, will talk on tax matters; Charles A. Owen will discuss the tidewater situation; George D. McElvane, Secretary of the National Tin Plate Association, will deliver an address on the work of commercial and trade associations; Vice-President Kane of the American Short-Line Railway Association will talk on "Transportation After 1920"; E. J. McVann will talk on the smokeless situation so far as experts are concerned; Milton C. Elliott will address the convention on the legal phases of control; Charles A. Allen, secretary of the Wholesale Coal Trade Association of New York, will discuss demurrage; and George H. Cushing, managing director of the American Wholesale Coal Association, has taken "Legislation" as his subject. In addition there will be talks by members of local associations on traffic subjects. The speakers at the banquet will be Former President Taft, Noah H. Swayne, 2nd, Governor Cornwell of West Virginia, and Judge Elliott.

Coal Operators Are Severely Condemned By Brotherhood Official

"COAL BARONS" and "Petroleum Pirates" came in for denunciation by Timothy Shea, assistant president of the Brotherhood of Locomotive Firemen, in the course of his final argument before the Railroad Labor Board. He said in part:

"In this connection, the public should understand that if it were not for the profiteers railroad workers could be given a square deal and a living wage without any increase in railroad rates. Next to wage earners and salaried people the railroads are the greatest victims of the profiteers. Railway equipment corporations, the steel trust, the coal barons and the petroleum pirates have grown fat on the excessive and unjustifiable profits they have exacted from the railroads, and unless some means is found to curb their greed they will gobble up the greater part of the billions which the railroads must spend for new equipment, betterments and materials of all kinds during the next few years."

Company Housing in the Bituminous Coal Fields Tends to Uniformity*

Isolation of Mining Towns, Dependence on One Industry and Shifting Character of Labor Force Compel Owners to Assume Responsibility—Houses Lack Ordinary Interior Conveniences — Streets Usually Are Dirt Roads — Sidewalks Rare

BY LEIFUR MAGNUSSON

IN THE latter part of 1916 the Bureau of Labor Statistics completed a comprehensive survey of housing by employers in the United States. This investigation comprised communities maintained by coal mining companies in western Pennsylvania, West Virginia, Ohio, Indiana, Kentucky, Tennessee, Alabama, Colorado and Wyoming, and included almost exclusively the better types of communities. Certain facts stand out as a result of this study.

1. The responsibility for the housing of a large proportion of the miners has been undertaken by the mine operators. The isolation of the average mining town, its dependence upon the one industry of mining, and frequently its impermanence and almost universal lack of local self-government, as well as the shifting character of the labor force, have compelled the mine owner to assume that responsibility.

2. The average company mining town has few of the amenities of ordinary community life. There is a dull uniformity in the appearance of the houses and an absence of trees and natural vegetation. Streets and alleys are open dirt roads almost without exception. Sidewalks are very rare.

3. The miner's house is without the ordinary inside conveniences found in the house of the city worker. Less than 2 per cent of the homes in the bituminous coal regions have inside toilets, and running water is rare. Stoves and grates are depended upon for heating.

4. The average house of the miner includes about four rooms, in which he must accommodate a family

*Reprinted from the Monthly Labor Review of the U. S. Department of Labor, April, 1920.

and frequently take in boarders when there is a housing shortage.

5. The rents of the miner's houses are comparatively low, most of them (12,343 out of 18,877, or 65.4 per cent) renting in 1916 for less than $8 per month. The rent in some instances probably constitutes a subsidy to the wages of the miner who lives in a company house. (What proportion of all bituminous coal miners live in company houses is not known.)

Scope of the Housing Survey

The survey was in no sense a census of the coal companies with respect to their practice in housing their employees. Observation, however, convinced the investigator that the practice of company housing was very widespread and uniform among the coal-mining companies.

The scope of the survey in the bituminous-coal region is indicated in Table 1.

TABLE I. SCOPE OF THE HOUSING INVESTIGATION IN THE BITUMINOUS COAL FIELDS

District	Number of Companies	Number of Communities	Number of Employees	Number of Employees Housed	Percentage of Employees Housed
Pennsylvania and W. Virginia	32	[1]114	78,218	43,877	56.1
Ohio and Indiana	3	4	1,287	688	53.5
Alabama	24	29	[2]18,694	[2]15,035	80.4
Colorado and Wyoming	5	16	4,644	3,148	67.8
Totals	64	163	102,843	62,748	61.0

[1] One company did not report number of establishments.
[2] Not including one company with 500 employees; number housed was not reported.

The chief characteristic of every company mining town is its uniformity, due to a tendency to erect houses of similar plan and type and to arrange them along rectangular lines of survey. Another feature of the mining town has been its disregard of the advantages of planting trees, grass and shrubbery as beautifying elements.

On the other hand, the mining town is characterized by relatively wide streets and ample lots. The streets are usually unpaved, open dirt roads. Sidewalks are extremely infrequent and only in the better parts of the community is there evidence of fenced and grassed courts.

The desirability of locating the houses near to the mines has frequently been secured at the sacrifice of conditions of health and comfort; thus in the coking region the houses are found placed on neighboring hillsides which have been rendered barren by the noxious gases of the beehive ovens. Frequently the towns were found placed not only immediately adjoining the ovens but with no consideration as to the prevailing winds in the region. With the prevailing winds from the west, houses to the east would be constantly enveloped in smoke. Consequently conditions of dreariness and desolation were quite common in the region. On the other hand, some operators pointed out that because of improved means of communication nearness to the mines is not as essential now as it was formerly. This is particularly true in the bituminous region of Pennsylvania, where the district is fairly closely settled. Workers in the bituminous-coal region of Pennsylvania commute from neighboring cities as far as seven miles away. Isolated "patches" in the region still exist by reason of pure inertia, as one of the more far-seeing managers remarked. It is unfortunate that the scattered locations of formerly individually owned mines were not consolidated into a single town with developed community life at the same time that the mines came under a single corporation control.

There are two prevailing types of houses found in the bituminous coal regions, the single or detached house and the double or semi-detached house, though a few row houses are found in the Pennsylvania and West Virginia and the Colorado and Wyoming districts.

The prevailing plan of house in the Birmingham district is a hip-roofed cottage about twenty-eight feet square with a chimney in the center of the roof, a front porch running the full length of the house, and a small porch at the rear. The houses are generally raised from the ground by brick piers four or five feet high, the area under the house being usually *uninclosed*. In the Tennessee and Kentucky coal fields small gable-roof cottages prevail. These, too, are generally without cellars; front and rear porches are common.

A type of house more or less peculiar to all small southern towns is the so-called "shotgun" house, shaped like an oblong box and divided into three rooms in a row and frequently with the doors connecting the rooms in alignment.

A feature of the mining towns, particularly of the Pennsylvania, West Virginia and Alabama districts, is the monotony of color in the painting of the houses, all of the dwellings in many towns being exactly alike in this respect. Often, too, they need paint badly.

Considerable variations exist as between the different industry groups and the different sections of the country. The prevailing size of dwelling for a family in the Pennsylvania and West Virginia bituminous coal region is either three or four rooms; in the Ohio and Indiana coal region, four rooms; in Alabama, Tennessee and Kentucky, three or four rooms; and in the coal towns of Colorado and Wyoming, four rooms. A considerable proportion of two-room houses is found in the bituminous coal regions of Alabama, Tennessee and Kentucky.

Sanitary conveniences are rarely found in mining towns. Thus in the soft-coal regions only 312 dwellings, or 1.9 per cent, of the 16,896 reported, have inside toilets, while 16,584, or 89.1 per cent, have outside toilets. In the more thickly settled anthracite region 19.5 per cent have inside toilets and 80.5 per cent outside.

Railroad Strike Makes Mines Idle

FIFTY-FOUR men forming freight-train crews on the Morgantown & Kingwood R.R., a coal carrier in northern West Virginia, went on strike on Tuesday, May 4, and refused to work for nearly an entire week because the general management of the Baltimore & Ohio R.R., which operates the Morgantown & Kingwood R.R., had not acceded to their demand for an 8-hour day with ten hours' pay, the freight trainmen on April 30, having served notice on the railroad officials that ten days would be given them to meet the demands.

For a time during the strike it seemed certain that the striking trainmen would be dismissed from the service, the management of the Baltimore & Ohio refusing to treat with the men unless they returned to work. This they were finally induced to do by officials of the Brotherhood of Railway Trainmen under assurances that their demands would be given early consideration by the railroad labor board and that they would not lose their seniority rights.

The Labor Situation

Edited by
R. Dawson Hall

Union Would Organize Mingo Field

Labor Leaders Seek to Surround Logan Field with Union Territory and Compel Surrender—Would Elect Sam. Montgomery

MOVES made by the United Mine Workers to organize the Mingo County mines are believed to presage a general movement to organize all the non-union mines in southern West Virginia, a movement which the operators in the section mentioned made plain some time ago would be greatly resented. It will be recalled that during the latter part of January John L. Lewis, president of the United Mine Workers, appeared in Bluefield and at that time announced that a determined effort would be made to organize the Pocahontas and other non-union fields.

Mingo County is directly west of Logan County, where an effort was made last year by the United Mine Workers to force unionization on the miners of the Guyan region, although no sentiment for organization existed among the miners in that field. The effort to organize the Mingo field is construed as part of a strategic move to surround the Logan field with a belt of organized miners.

To the southeast of the Logan field lie McDowell, Mercer and Wyoming counties, and these comprise that part of the Pocahontas field which is in West Virginia. As stated, the efforts of the union to organize the Pocahontas field have been quite active. The attempt to organize the miners in Mingo County is regarded in many quarters not only as industrially significant but also as having political significance in connection with the effort of the United Mine Workers' organization to nominate S. B. Montgomery in the Republican primaries as an out-and-out labor candidate.

The movement now on foot among the United Mine Workers to organize the Mingo and other non-union fields in southern West Virginia is closely interwoven with the political move to nominate Samuel B. Montgomery as the Republican candidate for Governor, Montgomery having been endorsed by the non-partisan labor organization in this state, dominated largely by the United Mine Workers. Little doubt as to this being the relation between the two drives remained after a meeting held at Matewan, in the heart of the Mingo County field, on May 7, at which mine workers were urged to join the union and to support Montgomery.

On the date already given Fred Mooney, secretary of district 17, United Mine Workers, and W. M. Blizzard, president of sub-district No. 2, were at Matewan directing the organizers in their attempt to organize the Thacker field.

Claims are made by Mooney and others that eleven local unions have been organized in Mingo County, the total membership being 2,000. This is denied by the operators of the field, who say that so far the United Mine Workers have failed to make any material headway in inducing miners in Mingo County to join the United Mine Workers. They claim that the miners see that there is nothing to be gained by affiliating with the union. However, organizers have been, and are still at work, so far as can be learned, and if reports be true the principal argument they are using is that if the field is organized the Government will see that a better car supply is furnished, conveying the impression that mines in the organized fields are receiving a full car supply. From this it will be seen that the shortage of cars is being used to strengthen the hands of the organizers.

Not only are mine organizers circulating propaganda in the Mingo field but a representative of the Department of Labor at Washington named McRoberts spoke at Williamson during the first week of May advocating the "Plumb Plan."

Deadwork Still a Lively Issue

AS the scales for deadwork in northern West Virginia were left by the Baltimore conference in their entirety to the operators and mine workers of the various local fields a meeting was held at Fairmont on May 7 to consider these matters.

The operators at the Fairmont conference were represented by J. W. Bischoff, of Elkins Coal & Coke Co.; C. H. Tarleton, of Fairmont, manager of the West Virginia division of the Consolidation Coal Co.; A. Lisle White, Clarksburg, W. Va.; Samuel D. Brady of Fairmont; George T. Bell, executive vice-president of the Northern West Virginia Coal Operators' Association, and E. S. McCullough, Fairmont commissioner of the same association.

Representatives of the miners were, C. F. Keeney, Charleston, president of district 17, United Mine Workers; William Petry, vice-president, district 17; W. F. Ray, A. C. Porter, Nick Aiello, Scott Reese, David Ware and Ira Marks, district board members.

Kansas Miners Allege That State and Court Conspired Against Them

WHEN, on May 15, the time came for the Crawford County District Court in Kansas to consider the application made by the officials of that state that the injunction issued against the calling of a strike of mine employees be made permanent, the United Mine Workers' counsel alleged that the plea should not be granted because the Kansas Industrial Relations Court, R. J. Hopkins, State Attorney General, and A. B. Keller, County Attorney, had conspired to create strife in the coal fields of the state with purpose of using the idleness as a reason for asking an injuction or for taking criminal action against the mine workers. The mine workers denied that President Howat or the 250 union officials had conspired in any way to bring about a cessation of work.

Gompers Wins Preliminary Advantage In Debate with Governor Allen

IN the debate on the Kansas Industrial Relations Court to be held May 29 by Samuel Gompers and Governor Allen of Kansas, Mr. Gompers will have the choice of opening or closing the debate. Governor Allen has been informed by telegram that in the drawing of straws luck favored the American Federation of Labor president.

Practically all the details have been arranged. Governor Allen is writing his speech. Each debater will be allowed an hour and a half to present his argument and fifteen minutes to close.

Kansas labor unions are making arrangements to send a large delegation of labor leaders to root for Gompers.

Miners Fear Public May Learn How Much Can Be Mined in a Day

TWO miner members of the British Parliament made a $250 wager on the amount of coal they could mine in two hours. The contest to determine the bet is to take place May 24. As soon as the report of the wager reached the newspapers there was a protest on the part of the miners and 2,000 threatened to strike. It would never do to let the public know just how much coal could be produced by conscientious work.

The two members of parliament who have raised this bad feeling by their reckless wagering are Allen Clement Edwards, from the South Division of East Ham, and John Walton, from the Don Valley Division of Yorkshire. They have already selected the Yorkshire colliery, where, surrounded by admiring (or by unfriendly) spectators they intend, for two hours apiece, to demonstrate how they can make the coal fly.

Two other miners, also M. P.'s, seem to have become "peeved" over the way in which Edwards has boasted his ability to roll out coal. They are Major David Watts Morgan, from the East Division of Rhondda, who holds the Distinguished Service Order, and Charles Butt Stanton, from the Aberdare Division of Merthyr Tydivil. "Who is this Yorkshire man, Edwards, anyway?" they seem to say. Surely there are better miners in Wales than can be found in Yorkshire" and they have challenged him to a contest similar to that he has agreed to enter into with Walton.

Dan Harrington To Be Fifth Member of Wage Board in Washington State

DANIEL HARRINGTON, who is the district engineer of the Bureau of Mines station at Golden, Col., has been agreed upon by the representatives of the United Mine Workers of district No. 10, of the State of Washington, and by the representative of the Washington Coal Producers' Association as the fifth member of the committee which is to determine the wage scale in Washington coal mines.

Domestic Coinage in April

DURING the month of April, the Treasury Department announces domestic coinage totaled $2,348,990, in 14,742,000 pieces.

Michigan Miners Want to Keep Their Dime Differential

MINERS in Michigan refuse to work unless the new scale assures them of the dime a ton increase that was promised them during the war, which they say they did not receive. President William Stevenson came to New York to ascertain the attitude of President John L. Lewis to the demands of the Michigan men. The Michigan mine leader says that Lewis favored the demands of the Michiganders.

The demand was not made before the Bituminous Coal Commission, but William Stevenson justifies that omission by saying that the matter was not arbitrable. The operators through their representative, H. C. O'Brien, declare that the change in scale was merely a war-time measure, and that as it was one which placed the Michigan operators at a disadvantage it should not be regarded as a permanent provision to be operative when coal is sold under co-operative conditions.

Mr. O'Brien says that the differential has been paid and probably will be till peace is formally declared, but the operators do not want the provision to be saddled on the Michigan operators till April 11, 1922. They are willing, and have offered, to submit to the decision of these arbitrators, whatever it may be, but they demand of the miners that they promise to do likewise, whether the decision be favorable or not.

Eastern Ohio Locals Reluctantly Confirm New Contract

AFTER the scale committee of the United Mine Workers of subdistrict No. 5—Eastern Ohio—had agreed to a contract with the operators of that area it was necessary to have the document approved by the delegates of the various locals. They met at Wheeling, W. Va., on May 4 and finally accepted the agreement though not without prolonged debate.

The mine workers had constructed a marvelous document, containing forty-one demands, all more or less radical. They were displeased to see most of them discarded when the contract was finally put in shape for signature. The increase granted under the new agreement will average about 27 per cent. There will be an advance of 34.8 per cent in the tonnage scale and a 20-per cent increase in the scale for day labor and deadwork. Approximately fifteen thousand miners will be affected by the new scale. A number of miners had refused to work pending the completion of the contract. Now that an agreement has been reached, it is believed that all miners will report for duty.

Fusion of Geological Survey and Bureau of Mines Is Proposed

FUSION of Geological Survey and the Bureau of Mines into a new type of bureau to be known as a division of the Interior Department is proposed in a bill which has been introduced by Senator Henderson. The division is to be under the immediate control and direction of an assistant secretary, who "shall be technically qualified by experience and education to exercise the powers and duties imposed." He is to be appointed by the President and it to receive a salary of $10,000 a year. This is regarded as a step toward attaining a separate department of mines.

Discussion by Readers

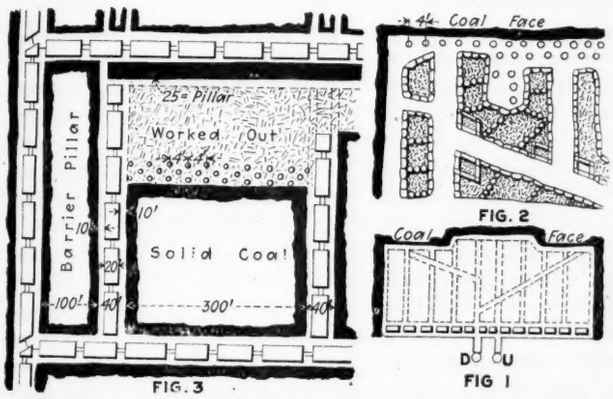
Edited by
James T. Beard

Working Three Seams of Coal That Extend Under a River

Referring to the question regarding the best method of working three seams that overlie each other in the Kanawha River district, as described in *Coal Age*, Feb. 26, p. 419, allow me to submit the following plan of working, which has been derived from my own experience under similar conditions.

For the purpose of securing the most complete extraction of the coal, I would open and work the upper one of these three seams first. Owing to the thinness of the coal in the two upper seams, I would use the longwall method of working each of these. In that method, as is well known, all of the coal is taken out in the first working, while the roof settles firmly on the packs that are built to keep the roads open.

In Fig. 1 is shown a general plan of the longwall advancing method. Starting from the foot of the downcast and upcast shafts, marked respectively D and U in



GENERAL PLAN AND DETAILS OF LONGWALL WORK

the figure, a main haulage road and return air-course are driven in the seam. These roads are 10 ft. in width, and enough roof is taken down to give a clear height of 7 ft. at the start. The material taken from the roof is used for building packwalls on each side of the roads. These roadpacks should be from 10 to 12 ft. in width and well built.

As shown in the figure, branch motor roads are driven to the right and left of the main haulage road and at right angles to it, starting at a distance of from 700 to 800 ft. from the downcast shaft. A longwall face is now started on the inside rib of the inner of these entries. As the face is advanced, packwalls are built to keep open the gateroads, which are turned on 40 or 42 ft. centers, as indicated by the dotted lines in the figure. These roads or "gates," as they are called, are cut off by diagonal or slant roads, which are driven from the main haulage road about every 200 ft. apart. As each place is cut off in this manner, the coal is taken out by the slant road and the remaining portion of the old road is abandoned.

In Fig. 2 is shown a detailed section of the work at the coal face. As indicated in this figure, wooden cribs are built at the corners of the roadpacks, where a permanent road intersects a gateroad. The cribs are made of old wooden props laid across each other, the space between them being filled with loose slate. This reinforces the packwall at the point where the greatest prssure comes and helps to keep the road open while the roof settles down on the packs.

For building cribs, old timbers are more springy and yield better to the settling roof than fresh live timber, which offers greater resistance and may cause the roof to break over the road. This is a feature that must be avoided always in longwall work.

At the Working Face

As further shown in Fig. 2, one or more rows of props are set on some systematic plan of timbering, along the face of the coal. Good cap-pieces are placed over each post, care being taken to range the caps at right angles to any joint or slip in the roof. The caps are of soft wood, 18 in. long, 6 in. wide and 2 or 3 in. thick. Each man's working face is about 42 ft. long, equally divided on either side of the gateway, which requires the handling of the coal a distance not exceeding 5 or 6 yd.

In working the middle seam, I would use a modified longwall system, such as shown in Fig. 3. In this system butt headings are driven off the main road, on centers of about 500 ft., and stalls or roads are turned off these butts, in pairs, on 300-ft. centers, after leaving a 100-ft. pillar between the main road and the first gateroad, for the purpose of protecting the main haulage road.

In Fig. 4, I have tried to illustrate the effect produced on the packs by the settlement of the roof or overburden. When the packs are well built the amount they will be compressed will range from 50 to 60 or 65 per

FIG. 4. SHOWING EFFECT OF TAKING OUT THE COAL

cent, depending on the character of the roofrock and depth of cover. In the figure, the original height of the packs was 3 ft. and this is shown as reduced to 14 in. by the settlement of the roof, following the extraction of the coal.

As shown in Fig. 3, the first gateroad is driven through to the next butt heading or airway. As the gateroads are driven up to within 25 ft. of the airway on the next pair of butts, No. 2 gateroad is connected with No. 3 gateroad by driving a cross-heading through the solid coal.

The work of extraction is now commenced and the coal worked out, in each panel, on the retreating plan,

keeping the face in one panel a few yards in advance of that in the next panel adjoining. Three rows of posts are kept behind each working face, the posts in each row being staggered, as shown in the figure. The 25-ft. pillar protecting the air-course on the next butt heading, and the entry pillars, are drawn back as those headings are finished.

System in Timbering

Thoughout the entire work I would adopt a systematic method of timbering, setting the posts 4 ft. apart, center to center, and keeping three rows of posts behind the track or face conveyor, if that is used. The back timbers are drawn and reset as the face is advanced, the posts being used over and over again.

When the work has been well advanced in the two upper seams I would start to work the lower seam on the room-and-pillar system, taking care to leave pillars of ample size to avoid the possibility of a squeeze occurring in the workings. In my opinion, a good rule to determine the width of the pillars is the following: Make the area of pillars, in square yards, equal to the depth of cover in fathoms, multiplied by twice the thickness of the seam, in feet. William Dickinson, Sr.

Oak Hill, W. Va.

Utilizing a Water Supply Struck in Sinking a Shaft

A recent reference to this subject, in *Coal Age*, has reminded me of an incident that may be of interest. It occurred in the sinking of two shafts for an operating company. The circumstances were about as follows:

In the process of sinking one of these shaft, between the Sewickly and the Pittsburgh seams, we had been in hard sandrock for a distance of 35 ft. when, on firing a sump round, we struck a stream of water that caused us to put in a pump of greater capacity. A little later, when the shaft was squared up, we found that the water was coming from the hillside, and this opinion was confirmed by the fact that some few days after, several people residing in the neighborhood reported that their wells were running dry.

At this time, the men working in the shaft were drinking the water and said it was the best they had tasted in that vicinity. Also, people came from a distance around bringing their water pails and sending them down the shaft for water. Simply as a matter of precaution, I sent a sample of the water to the laboratory for analysis.

Water Reported Unfit for Use

I had a plan to excavate a lodgment in the side of the shaft, that would have sufficient capacity to serve as a reservoir to collect and hold the water, which I contemplated pumping to a tank on the hill. This I thought would serve the purpose of providing a good water supply for domestic use. The management agreed to the plan; but, a few days later, a report came from the laboratory stating that the water was not sufficiently pure for domestic use and the plan was abandoned until a further investigation could be made.

That settled the question, as far as the shaft was concerned, and now it became necessary to make some provision for taking care of the water, before continuing the sinking of the shaft. In this, I was guided by two considerations: First, I knew that the flow of this water into the shaft would seriously impede the work of concreting when the bottom of the shaft was reached. Second, I was skeptical in regard to the water being unfit for use, and felt that this opinion might be changed when a further test of the water had been made. It was my purpose, therefore, to save this supply of water for future use if needed.

Having made a jackhamer bit of the right size, I drilled three 18-in. holes, horizontally, into the sidewall of the shaft where the water was coming. Into each hole, I drove a 2-in. pipe or nipple, 2 ft. in length. After corking around the pipes so as to prevent the flow of water into the shaft, the three pipes were connected with a column pipe or leader extending downward. This was provided with a valve to shut off the water and the scheme proved a practical success.

The Plan a Wise Provision

When the shaft reached the coal, an excavation was made in the seam and a large sump provided as a lodgment for the water. The standpipe was then extended to the bottom of the shaft. This 3-in. line had been carried down the shaft inside of the forms that were being placed in position for concreting the shaft from the bottom up. The 3-in. pipe terminated below the arch, on the side of the shaft near the wall, and a valve was provided at the end of the pipe to control the flow of water into the sump.

It will not seem strange that when the shaft was finished, the company decided to use this water supply and installed an electric pump at the bottom of the shaft for the purpose of pumping the water to the surface. It is clear that a greater efficiency would have been secured had the first plan been adopted of building the lodgment and installing the pump in the side of the shaft where the flow of water was struck.

The original plan would also have avoided the nuisance of a pump installed at the bottom of the shaft. Had it not been for my efforts to save this water supply, however, it would have been necessary to have made other provisions, at a considerable expense for drilling, or use other means to obtain water. The incident shows the necessity of forethought in providing for the future economical operation of the mine.

Fairmont, W. Va. John E. Ambrose.

Applying the Golden Rule in Industry Will Strengthen an Organization

No one of the letters that have appeared in *Coal Age* has interested me as that written by John Rose on Health and Industry, which appeared in the issue Feb. 19, p. 364, and which drew attention to the need of a more practical application of the Golden Rule in industry.

If the ideas expressed in Mr. Rose's letter and those given in another excellent article that appeared as a Foreword, entitled "Removing the Cause of Trouble," Vol. 15, p. 561, could be practiced by coal operators and mine workers alike, our labor troubles would cease and quickly become a thing of the past. Working men would realize their error in carrying on and supporting an unnecessary organization, because any differences that might arise between them and their employers would be speedily adjusted in the interests of both.

Ever since *Coal Age* came into existence, I have been greatly pleased with its policy in reference to the settlement of labor troubles by the Golden Rule. I much regret to say, however, that my experience in this country and at home, on the other side of the water, has convinced me that mine operators who practice fair and square dealing with their men are few indeed.

Not only in coal mining, but in all industries alike, there are many hypocrites who make a fair pretense at square dealing with their workers. To overcome this hypocrisy, the worker is compelled to devote a portion of his earnings, in an effort to secure his rights by building up and strenghtening an organization for which there should be no necessity.

Far better would it be for both employer and employed if they would come together in a spirit that regarded the common interests of each, where the result would be a lesser sacrifice than is now being made by either party. Let us hope for a more practical application of the Golden Rule, which will mean living up to our religion instead of practicing hypocrisy.

Staunton, Ill. HENRY BOCK.

Numerous Unsafe Practices of Miners in Blasting Coal and Rock in Mines

In reading the letter of John Rose, *Coal Age*, Mar. 25, p. 603, I was surprised to notice that he gives an instance of a miner pounding a charge of dynamite so hard that the men working in the next place heard him. Evidently, the man must have been using a steel tamping bar, as it would be impossible to make a noise that would be heard in an adjoining place when tamping a shot with a wooden tamping bar.

We know that all miners, more or less, have different ways of doing their work. While it is my practice to use a wooden bar for tamping a shot, I have seen miners use steel bars. Sometimes these bars are tipped with copper to lessen the danger of the steel striking a spark by coming in contact with any hard substance in the coal.

OBSERVING THE PRACTICES OF MINERS

On some occasions, I have seen miners when using a blasting barrel insert a cap in the barrel, or when using a needle they would insert the cap in the needlehole and fire the shot with a squib. Again, I have seen miners use two kinds of powder in the same hole; that is, black powder and dynamite. At times they would put a cap into a cartridge or primer, crimping the cap to the end of the fuse with their teeth. Others would use a spike to insert the cap in the cartridge.

I have seen miners use frozen dynamite instead of taking the time to thaw it. All these practices are out of date and should be abandoned. A miner will do many things, in his haste to get away and go home, that he would not do otherwise. But the man that takes his time and works safe always accomplishes more and gets the best results.

Speaking of tamping dynamite, I recommend tamping a charge of any explosive fully to the mouth of the hole. For this purpose I use the drillings of the hole made up in small cartridges and tamped with a wooden tamping bar. It has always seemed to me that there is danger in pushing a wad of paper into the hole and forcing it down onto the charge. The time when the most care is needed is when pushing anything into the hole on top of the charge or until there is a foot or so of tamping in the hole. I have always found that where a charge of dynamite is well confined in the hole the best results are obtained. BENJAMIN DEEBLE.

Pittston, Pa.

[Many will disagree with this correspondent's suggestion of stemming a hole with the drillings of the hole made up in cartridges. In blasting coal, nothing is more unsafe than to tamp a hole with coal dust or fine slack. Such a practice is almost sure to result in a windy shot and makes possible a local dust explosion that may have serious results.—EDITOR.]

To Explore a Mine with an Open Light Is Dangerous

It may be an example of either ignorance, indifference or contempt of the elementary laws taught in all textbooks treating on mine gases and ventilation, that would assume the condition of the air in an abandoned mine to be safe and such as to permit one to enter the mine either with an open light or even an electric lamp. Such must have been the attitude of mind of the two men who recently lost their lives when attempting to explore an abandoned mine, having only a small flashlight, and fell victims to their recklessness, being suffocated by the deadly blackdamp that filled the passageways.

The value of a technical education to mine foremen and firebosses, in so far as it applies to gasses and ventilation, should never be overestimated. Yet there are many who regard such a training as a burden, and do not hesitate to express for it a wholesome contempt. Others regard the need of such knowledge as a necessary evil in coal mining. Especially is that true when there are mathematical formulas to be remembered, in their practical application to the circulation of air and its distribution in the mine workings.

NEED OF MINING EXAMINATIONS

In view of the fact that legislators in many coal-producing states have not regarded this subject of sufficient importance to make a mining examination compulsory for mine foremen and firebosses, it is of little wonder that many mine officials are indifferent to this need. Such persons, it may be assumed, will present the same indifferent attitude in respect to maintaining safe and healthful conditions in the mines in their charge or under their supervision.

The advent and use of the electric mine lamp marks a most important advance in safe and efficient coal-mining practice. It is safe to say that the electric miner's lamp has come to stay; and yet it is neither logical nor practical to use such a lamp for the purpose of examining a mine for gas. The lamp gives no indication of the presence of explosive or poisonous gases; and the real danger when entering abandoned workings lies in the presence of either or both of these gases.

Therefore, when entering an abandoned mine, or in the examination of a mine, there is no choice but to use an approved type of safety lamp. To use an electric lamp or an open light for that purpose would be to invite disaster. To ascertain the presence of carbon monoxide, the only safe means lies in the use of caged birds or mice, the examiner being himself protected by breathing apparatus. In daily practice, however, this gas is suspected only under certain conditions, resulting from mine fires, gob fires, or the afterdamp of an

explosion. We have no right to assume that an abandoned mine does not contain dangerous gases, and risk life itself by so doing.

We all learn by experience, and although I have entered and explored some mines that have been abandoned for a considerable time with a feeling of perfect security, in recent years it has been my almost invariable practice, on such occasions, to carry a good safety lamp, instead of either an electric lamp or an open light. There are many dangers to be met in exploring an abandoned mine, such as open trapdoors, roof falls, stoppings squeezed out by the roof pressure, gob fires, all or any of which should be suspected and provision made to avoid their danger.

Let this and similar incidents, in which good men have sacrificed their lives, emphasize for us the importance of technical training and its daily application to mining practice.

W. H. NOONE.

Thomas, W. Va.

Causes of Mine Explosions

Kindly let me refer to the account of an unexplained explosion that occurred in a coal mine working the Freeport seam, in the Cambridge district, in Ohio, and which was submitted for the consideration of *Coal Age* readers in the issue of Jan. 22, p. 197. I desire to offer a few suggestions or thoughts relating to the cause of that explosion. In the same connection, I read with interest the letter of Robert W. Lightburn, Feb. 12, p. 324, giving his view as to the probable cause of that explosion.

The inquiry fails to state clearly the exact time when the explosion occurred. It merely states that "the fireboss had examined the place about two hours before and found no gas." To my mind, the time when the examination was made would have something to do with determining the cause of the explosion. For instance, if the place was visited by the fireboss in the early morning, two hours before the men entered for work and the explosion took place, it is barely possible that the fireboss was pushed for time and made a hurried examination for gas at the most convenient point.

When a Fireboss is Rushed

Knowing that the place was generally free from gas, a fireboss who is pushed for time is quite liable to make a hurried test and assume that no gas is present. A more thorough examination, however, in the present instance, might have revealed a sufficient quantity of gas to have caused the explosion. On the other hand, if the examination was made later in the day, after the men had started to work, it is more probable that the gas that caused the trouble was liberated by reason of the heaving of the floor, which is a common occurrence in pillar workings.

Just here, I recall a remarkable instance that occurred in a mine where I was acting as fireboss at the time. The mine was being robbed out and everything had been drawn back to within 1,500 ft. of the entrance. Three men were at work drawing an entry pillar that measured about 25 x 35 ft., in area. The coal was about 3 ft. thick, underlaid with a hard rock, while the roof was a good slate. No gas had been found previously in this part of the mine; but, as may be imagined, there was a considerable open space that had been worked out behind the men and was standing on timbers.

A good current of air was passing where the men were working, mining the coal with picks and loading it into cars. Suddenly, there was heard a loud report like that of an ordinary coal shot, and a space 8 ft. in width was blown from the center of the pillar to one side, instantly killing one of the miners. The coal was crushed into fragments, the blast resembling that of a heavy charge of powder. There was no flame or smoke and no heat was felt.

Turning, again, to the inquiry before us, the fact that the loader was "holding his carbide lamp in his hand near the floor" would seem to indicate that he was suspicious that there might be gas at the roof, which is possible. His movements would naturally bring it down where it would be ignited on his lamp. If that was the case, the fireboss is probably to blame.

It does not appear to me that this was, in any way, a dust explosion, though machines were used to mine the coal. The theory of vaporized oil, to my mind, is incredible, for the reason that if there was sufficient oil seeping from the strata and vaporizing to cause an explosion, the same oily vapor would have accumulated again in a short time and caused a second explosion.

The suggestion has been offered that a heavy roof fall may have driven gas out from the waste where it had accumulated. It is stated that the pillar "was nearly all extracted," and it is probable there was a large space open behind the men. That being the case, the quantity of gas accumulated would seem to me to have been enough to have produced a disastrous explosion, much greater than what is described in the inquiry.

Emission of Gas in Mines

In my practice as a miner and fireboss, I have observed gas escaping from the coal, roof and floor and, at times, coming from all three places at once. I regard the danger less when the gas is coming from the coal than when it issues from the roof or the floor. My reason is that gas coming from the coal has more opportunity to diffuse and be carried away in the air current; while a break in the roof or the heaving of the floor may liberate a considerable quantity of gas that would cause trouble.

My experience agrees with what Mr. Lightburn has stated in regard to gas issuing in numerous small feeders, along the ribs of places that were working, where it was possible to light these small feeders with one's lamp. I recall one instance where a gas feeder in the roof of a main entry gave much annoyance, as miners passing down the entry would forget the feeder and the gas would be ignited, exploding with quite a report, as the lamp the man carried on his head came in contact with the gas.

In closing, allow me to state that my 20 years of practice as fireboss does not agree with the idea now taught that explosive gas will frequently be found near the floor of working places, while a lamp will be extinguished, at times, near the roof. I can understand how this might be the case where the floor was liberating methane and blackdamp was coming through crevices in the roof and connecting with an overlying seam. My experience has been where the conditions were normal, explosive gas is always found at the roof of working places.

JOHN ROSE,

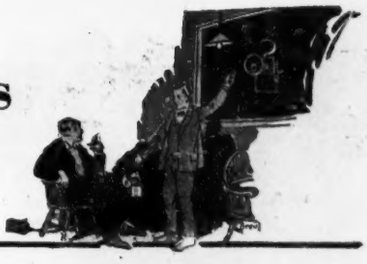
Dayton, Tenn. Former State Mine Inspector.

[The Inquiry page has, unavoidably, been crowded out this week by reason of necessary changes.—EDITOR.]

Examination Questions

Answered by

James T. Beard



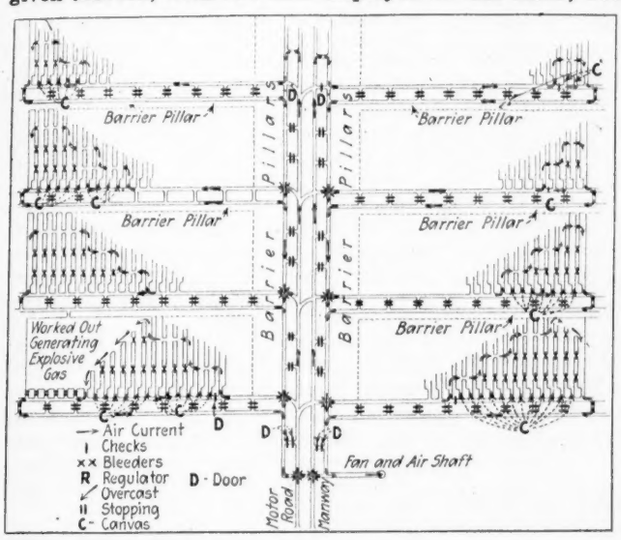
Bituminous (17th Dist., Pa.) Mine Foremen's Examination, April 6, 1920

(Second Grade, Selected Questions.)

Ques.—What is the total quantity of air, in cubic feet per minute, passing through an airway 7 x 7 ft., when the velocity of the air current is 300 ft. per minute?

Ans.—The sectional area of this airway is: $7 \times 7 = 49$ sq. ft. Therefore, assuming this is the clear area of passage and the average velocity of the current is 300 ft. per min., the quantity of air passing is $300 \times 49 = 14{,}700$ cu. ft. per min.

Ques.—Show on the accompanying map how you would ventilate the same, according to the instructions given thereon, with 200 men employed in this mine; 100



men on the right and 100 men on the left of the main entries.

Ans.—The direction of the air current in the several splits is indicated by the arrows in the figure.

Ques.—State briefly the duties of a miner, driver, machine runner, and motorman.

Ans.—The first duty of a miner, on entering his place in the morning, or after firing a shot, is to examine the place for any roof or coal that is liable to fall. The miner must observe also the mark of the fireboss, which shows that the place has been examined that morning. He must reset any timbers that have been discharged by the shots that have been fired, and this must be done before proceeding to do other work. The miner must use every precaution to protect himself from danger and not violate any of the mine laws and regulations.

The duty of a driver is to use every precaution to avoid accident both to himself and others, when hauling out the loads or placing the empties. He must never leave a car standing where it is liable to be struck by another car passing in or out of the mine, or where it can get loose and run out onto the main track. He must also take good care of his mule and not leave it in an unsafe place where it is liable to be injured.

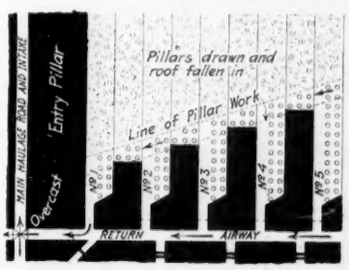
A machine runner is responsible for the proper care of his machine when in use. It is his duty to cut the coal to the required depth in each place in his district. He must observe and see that his helper works in a safe manner and to the best advantage, in keeping the machine clear while cutting the coal.

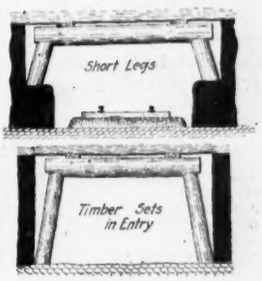
A motorman is responsible for the proper use and care of the locomotive in his charge. It is his duty to inform himself in regard to the construction and operation of the machine he must handle. Like the driver, he must use every precaution to avoid accident to himself, his helper and others.

Ques.—What system of timbering would you adopt where the coal is undercut by mining machines: (a) In rooms; (b) in pillars; (c) in entries? Make a diagram showing the system employed in each of these cases.

Ans.—(a) In driving rooms, under ordinary conditions of roof and floor, a row of posts should be carried on the side of the room track opposite to and parallel to the rib along which the road is laid. At the face, a systematic method of timbering should be adopted suitable to the conditions that exist in any particular place. Ordinarily, two or more rows of posts are set parallel to the coal face, the posts being stood three or four feet apart, center to center. The rows of posts are spaced the same distance apart, and the posts in each alternate row are staggered.

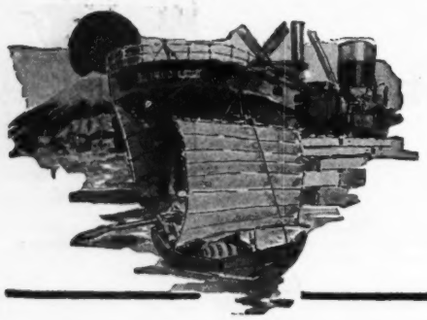
(b) On the left of the accompanying figure is shown the conditions that exist when drawing back the pillars





in the different rooms. The arrangement of the posts, however, will vary according to the conditions in the seam; but it should always be remembered that there must be two or more rows of posts behind the men and between them and the waste, where the roof has fallen.

(c) When driving entries, posts should be stood on each side of the road where it appears that the roof needs to be supported. Post timbering at the head of entries will vary with the conditions of roof and floor. When driving under a hard roof slate, it will seldom be necessary to set any posts at the head of the entry. On the other hand, when driving under a drawslate, this must be supported on posts, until it is taken down or the permanent timbers put in position. On the right of the accompanying figure is shown two methods of framing the permanent timber sets in an entry.



Foreign Markets and Export News

American Construction Materials Needed by Brazil

Brazil offers a market for all kinds of construction materials and machinery, not only in the immediate future but for an indefinite time to come, according to Trade Commissioner W. W. Ewing, whose report on that country has just been issued by the Bureau of Foreign and Domestic Commerce, Department of Commerce.

Mr. Ewing recently returned to the United States after a tour of investigation covering all the South American republics. He is convinced that Brazil, by reason of its vast undeveloped territory and its immense resources, is rapidly increasing in importance as an export field.

Some of the goods that it will most urgently need in the next few years are coal, iron, steel, cement, caustic soda, sulphuric acid, chemical and medical products, paper, and most manufactured materials requiring skill and experience in their production, such as engines, agricultural machinery, cutlery, the finer grades of glassware, oils, paints and railway materials of all kinds.

Coal Exports for March Show Marked Increase

Exports of coal during March, 1920, together with the revised figures for March of 1919, compiled by the Bureau of Foreign and Domestic Commerce, are as follows:

Coal and Coke	March 1919, Tons	March, 1920, Tons
Coal:		
Anthracite	117,805	419,682
Bituminous	554,037	1,500,540
Exported to:		
Italy	17,197	137,833
Netherlands	26,743	100,843
Sweden	None	17,706
Switzerland	None	33,763
Canada	352,883	639,635
Panama	5,290	18,306
Mexico	5 429	15,696
British West Indies	15,196	33,298
Cuba	38,107	115,982
Other West Indies	6,352	9,422
Argentina	8,670	80,346
Brazil	60,296	65,726
Chile	6,934	7,783
Uruguay	3,660	18,695
Other countries	7,280	205,506
Coke	33,749	55,435

Imports of coal during March, 1920, were 71,126 tons. Practically all of this coal came from Canada.

The following tables show exports of domestic coal and coke from the United States by countries and by customs districts and the bunker coal supplied to vessels in the foreign trade at specified districts during March, 1920:

EXPORTS OF U. S. COAL IN GROSS TONS

	Coal		
	Anthracite	Bituminous	Coke
Azores and Madeira Isl.	.....	5,601	.....
Belgium	.....	18,003	466
Denmark	2 205	9,763	.....
France	896	79,458	.....
Germany	2	7,165	.....
Greece	.....	4 496	.....
Italy	32	137,833	.....
Netherlands	.....	100,843	.....
Norway	.....	15,161	45
Portugal	.....	1,333	.....
Spain	.....	5,523	.....
Sweden	.....	17,706	.....
Switzerland	13,393	33,763	.....
England	.....	13,078	.....
Scotland	.....	6,722	.....
Bermuda	885	3,188	.....
British Honduras	.....	47	.....
Canada	384,053	639,635	31,434
Costa Rica	.....	.....	25
Guatemala	310	.....	.....
Honduras	.....	700	.....
Nicaragua	.....	224	.....
Panama	.....	18,306	9
Salvador	.....	.....	7
Mexico	858	15,696	14,132
Newfoundland and Labrador	72	.....	.....
Barbados	70	5,506	.....
Jamaica	25	11,172	.....
Trinidad and Tobago	.....	9,512	.....
Other British West Indies	.....	7,108	.....
Cuba	7,380	115,982	694
Virgin Islands of U. S.	.....	2,491	2
Dutch West Indies	.....	4,654	.....
French West Indies	3,310	2,277	.....
Dominican Republic	1,949	.....	25
Argentina	3,060	80,346	.....
Brazil	.....	65,726	.....
Chile	248	7,783	8,440
Colombia	.....	1,035	.....
Ecuador	861	.....	2
British Guiana	.....	2,445	.....
Peru	40	50	50
Uruguay	30	18,695	.....
Venezuela	3	.....	4
Dutch East Indies	.....	.....	100
Canary Islands	.....	1,717	.....
French Africa	.....	12,292	.....
Egypt	.....	17,505	.....
Totals	419,682	1,500,540	55.435

COAL EXPORTED BY CUSTOMS DISTRICTS

	Coal		
	Anthracite	Bituminous	Coke
Maine and New Hampshire	22	65	166
Vermont	1,711	9,137	362
Massachusetts	72	.....	.....
St. Lawrence	128,601	124,248	1 296
Rochester	3,215	53,795	125
Buffalo	241,792	311,338	13,510
New York	10,370	4,649	1,349
Philadelphia	23,742	22,402	.....
Maryland	.....	51.868	8,461
Virginia	30	693,137	.....
South Carolina	.....	46,111	.....
Georgia	.....	8,272	.....
Florida	.....	11,663	.....
Mobile	.....	1,746	.....
New Orleans	3,620	9,084	100
Sabine	.....	.....	45
Galveston	.....	75	.....
San Antonio	346	1,643	696
El Paso	249	9,177	2,965
San Diego	5	9	1
Arizona	38	1,063	10,336
San Francisco	.....	.....	46
Oregon	5,751	.....	.....
Washington	.....	81	71
Dakota	76	2,405	238
Duluth and Superior	.....	23,258	50
Michigan	42	115,308	15,616
Porto Rico	.....	6	2
Totals	419,682	1,500,540	55,435

BUNKER COAL

Districts:	Tons
Maryland	43 982
New York	280,000
Philadelphia	40,297
Virginia	256,376

Exports Increase Despite Low Exchange Rates

For several months past there have been predictions of a falling off in exports, due to the unsatisfactory exchange situation. Government figures giving the value of total exports do not bear out these predictions, however. The figures for the month of February, it is true, show a decline of $87,000,000 as compared with January, but in comparing the two months certain factors should be considered.

In the first place, in the month of February there were only twenty-two working days as against twenty-six in January. The value of the average daily exports for the former month therefore were more than $1,000,000 in excess of those for January.

Taking the Government figures for the seven months from June, 1919, to January, 1920, inclusive, and allowing an average of twenty-five working days for each month it will be found that the average daily exports for this period were $26,200,000, whereas the daily average for the month of February was $29,300,000.

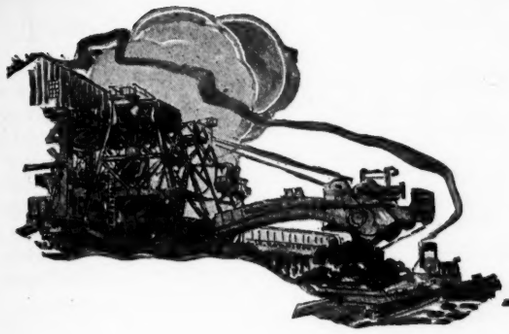
In analyzing the February figures it should also be remembered that that month was the worst of the entire period under review from a transportation standpoint. During almost the entire month the railroads were blocked by snow and ice and export freight was moved to seaboard with difficulty.

It is true that for some months past the steamship operators have been complaining of a dearth of cargo, but this is undoubtedly due to the fact that there is a much greater amount of ocean tonnage available than before.

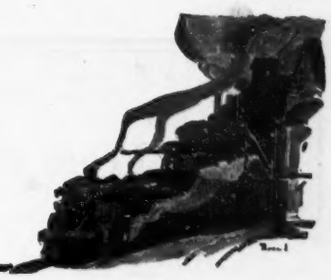
In view of these facts it would seem that the export trade of this country is continuing on a very favorable basis in spite of the many discouraging reports that have gained circulation during recent months. It is true that certain lines have experienced a depression, but on the other hand, several other lines have shown steady improvement, notably steel and machinery. Certain readjustments are to be expected, but that there will be any great decrease now seems improbable. — From *The World's Markets*, published by R. G. Dun & Co.

London Gets More Coal Than in Pre-War Times

During 1919, Alfred Nutting reports, about 2,000,000 tons of coal were brought to London by rail in excess of that so conveyed prior to the war.



Production and the Market



Weekly Review

Crisis Approaching in Transportation—Switchmen's Strike More Serious Than Most Believed —Production of Coal Gains But Little and Prices Are Going Up on Spot Market, But with Little Free Coal To Be Had at Fancy Prices

CONTROL of the distribution of coal is impending, if not, at least in part, already upon us. The effect of four weeks of strikes on the railroads is now being felt by every line of business, and concerted efforts are being made to get relief on a national scale. Priority of transportation for food, fuel and "other necessities" is the answer proposed by railway men and the Commerce Commission.

From every point comes the word that consumers are each day burning more coal than they receive, if they have not already ceased burning coal at all. From the coal fields nothing but solid train movement is being attempted, for the yards and terminals present the most difficult problem to the railroad operating men.

The Interstate Commerce Commission is taking charge of the situation under the emergency clauses of the Transportation act. The National Coal Association has pointed out in detail to that body the imperative need of preferential treatment of coal. Food has already been given the right of way. From now on the big scramble will be to get priority orders and many see a return of the conglomeration of priorities and special assigned cars for commercial consumers that cluttered up the rails in the winter of 1917-1918.

Inspectors of the Government are on the road locating the traffic jams and relief is expected but slowly, so congested are the yards and gateways. Coal will be at a premium from now on and except for railroad fuel and those consumers who may obtain preferments, very little will move to inland territory until the trouble is over.

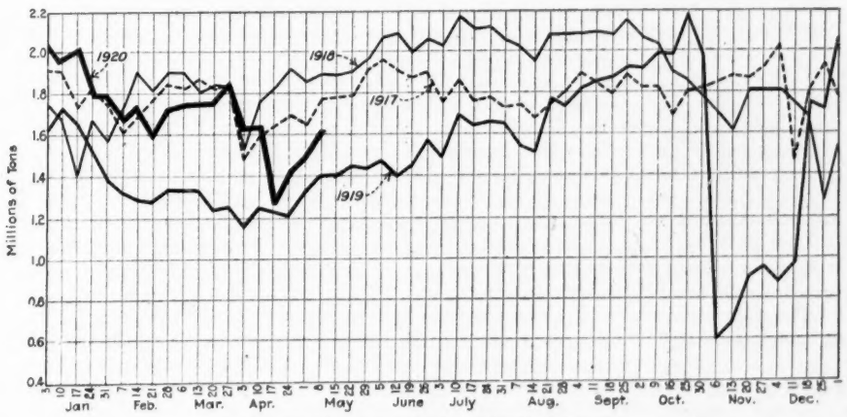
Production of both bituminous and anthracite continues to gain, but the progress is very slow. (The average daily output shown on the diagram below should read 1,511,000 tons instead of 1,615,000 for May 8.) The gain in bituminous was but 2 per cent and for anthracite but 3 per cent. West of the Mississippi River transportation appears to be about normal and the operators in Colorado, New Mexico and Washington have started buy-early campaigns. East of the river the congestion extends to the furthermost limits of New England, but not as far as Birmingham.

Prices, of course, remain firm, even advancing at certain points. At Philadelphia $7 coal is expected and $5 is a common spot mine price in the Cleveland market. There is nothing in sight to help hold prices to reasonable level except the self-restraint of the producers. Consumers have forgotten price and the jobber is out to get the coal for his customers.

The movement to tide continues in good volume. It is a movement that is easy for the railroads and profitable for the shipper. Northestern Kentucky reports heavy shipments to Hampton Roads, as does Logan. The regular tide shippers are all going strong. Lake Erie is getting little coal these days.

Anthracite is keeping up with current needs for consumption but not with demand for storage. The state of the railroads is held largely to blame for the condition. Prices are largely in abeyance, but retailers are adding on a figure to cover the expected advance.

Average Daily Production of Bituminous Coal*



*From weekly report of Geological Survey.

Reports From the Market Centers

New England

BOSTON

Embargoes Resumed — Prices Soar to New Levels — Strong Demand — Railroad Confiscation of Coal General — Receipts from Hampton Roads Continue Light—Quotations Still Advancing — Anthracite Shipments Meager All-Rail, but Improve by Water.

Bituminous—Effective April 12, the Boston & Maine laid an embargo against all commercial coal from the New York Central and the Delaware & Hudson, thereby again cutting off further supply from the largest consuming area in New England. With this embargo renewed, it is difficult to say what will be the outcome. Several large plants have taken heavy consignments of steam sizes of anthracite, but practically all the smaller users have not cared to take precautions of that kind against a possible shortage of bituminous.

The present traffic situation here seems about as bad as it could be and embargoes may be intermittent throughout the season. The lack of motive power and other equipment is notorious, and roads like the New Haven must get relief from some powerful agency. Other roads are short of locomotives, though not to the same degree.

Spot coal has advanced by leaps and bounds the past fortnight. Sales have been plentiful at $7 and over for only medium grades, and there is continuous pressure to secure early shipments. Most of the high-grade coal is out of the market, a heavy volume having been sold on contract or for bunker or export requirements.

One effect of the embargoes against New England will be an increasing tonnage available for other markets, and it will be of interest to observe the trend of prices a week or so hence. Some feel that a more conservative market will follow. However, there is little on which to base a prediction.

It is certain that the demand is sustained and with much strength. Undeniably spot coal has been sold for more extended delivery than would normally be the case. Seven dollars is a highly remunerative figure, and producers are willing to undertake business on that basis for long periods.

With much of New England closed to all-rail delivery, water coal will be still more eagerly sought. The supply, however, is by no means adequate for the demand.

The railroads are still commandeering coal in large volume. Railroad practice is most arbitrary in this respect and it is the opinion that railroads must share increased costs of fuel along with other steam-users.

Despatch at Hampton Roads is now practically normal, steamers being loaded within 24 to 48 hours of arrival. Movement from the mines is good and as usual the heaviest volume of coal is moving on contract. Clearances for New England continue light, with little bidding for the smokeless coals.

High prices have been paid for small lots for prompt loading, but few of these have been for cargoes destined for this market. F.o.b. Boston and Providence, quotations on Pocahontas and New River have risen to $12.50, although sales are still reported at less.

Quotations on bituminous at wholesale now range about as follows:

	Cambrias and Somersets	Clearfields
F.o.b. mines, net tons	5.75 @ 7.00	5.25 @ 6.25
F.o.b. Philadelphia, gross tons	8.30 @ 9.70	7.75 @ 8.80
F.o.b. New York, gross tons	8.65 @ 10.15	8.10 @ 9.25

Anthracite — Receipts of domestic sizes continue extremely meager by the all-rail route. The New Haven embargo is now joined by the Boston & Maine's action against all coal from off the New York Central and the Delaware & Hudson. The congestion at the gateways is unabated.

The New Haven management is willing to accept coal only in train-load to obviate the usual switching and make-up at Maybrook and Harlem River. The result is a deadlock, with only quite light shipments coming through.

NEW YORK

Anthracite Situation Grave—Receipts Care for Current Needs—No Increase in Prices—Small Sizes Are in Demand —Car Supply in Bituminous Regions Improves—Demand Forces Prices Upward.

Anthracite—Continuation of the labor troubles among the railroad employees has resulted in a serious situation here. Receipts at the loading piers are far below requirements, although the dumpings at the upper ports for the week showed some improvement. However, the difficulty in having boats towed from the lower ports are far from over.

The failure of the operators and miners to come to an understanding regarding a new wage schedule has caused considerable uncertainty in the trade. These conferences are now being held in Washington.

Not all of the big producers have advanced their mine prices, but most of the independents have advanced their quotations $1 per ton for egg, stove and chestnut, which includes the differential of 75c. allowed above company prices.

Some of the smaller operators are said to be able to obtain premiums on their domestic coals if they can promise prompt shipments. Embargoes on shipments to Buffalo and other Lake ports continue to be in force on some of the railroads.

Locally the conditions are serious. Retailers are receiving barely enough coal to meet necessities and much of their equipment is tied up. Prices are not being quoted, retail dealers waiting for their new mine prices to be announced by the large companies when the new wage agreement is announced.

There is a steady demand for the smaller sizes used in heating apartment houses, hotels and office buildings. The supply is running short and reserve stocks are now being used. For these coals, buckwheat was quoted at from $4.25 to $4.75 at the mines; rice from $3 to $3.50 and barley from $2.25 to $2.75. Loaded boats of buckwheat are in strong demand.

Current quotations for company coal per gross tons at mine and f.o.b., tidewater, at the lower ports are as follows:

	Mine	Tidewater
Broken	$5.95	$7.80
Egg	6.35–7.35	8.20–9.20
Stove	6.60–7.70	8.45–9.55
Chestnut	6.70–7.70	8.55–9.55
Pea	5.30	7.05
Buckwheat	3.40–3.75	5.15–5.50
Rice	2.75–3.25	4.50–5.00
Barley	2.25–2.50	4.00–4.25
Boiler	2.50	4.25

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates.

Bituminous — The local situation shows no improvement. Receipts at the tidewater docks are slow, due to transportation difficulties.

In the mining regions, lack of cars is given as the crux of the situation. Mine workers are willing to work but because of the poor car supply are idle about half of the time. Improvement in car supply, however, is reported along the New York Central, Baltimore & Ohio and Western Maryland roads, while some operators along the Pennsylvania report a slight betterment.

Loading at the local piers has been slow due to the lack of help and the inexperience of those at work. In addition the scarcity of tugs does not permit of anything like capacity operations.

Lack of coal has resulted in many factories closing down in New Jersey and in New England, while a continuation of the present situation for another fortnight, will result in the closing down of many others.

Exporters of coal are forced to refuse new business if prompt shipments are required. There are bottoms enough but the poor car supply and the local demand prevent their being loaded.

Quotations for the various grades at the mine, per net ton, ranged from $5.50 to $6.75, according to grade. Gas coal was quoted around $6.50. There were many inquiries for smithing coal but it was not to be had, prospective buyers being advised to substitute the coals in Pools 9 and 71.

PHILADELPHIA

Anthracite Shipments in Good Volume, but Price Uncertain — Stove and Nut in Demand with Pea Strong—Buckwheat Grows as Domestic Fuel—Steam Trade Centers Around Buckwheat—Rice and Barley Quiet—Bituminous Shows No Improvement—Prices Moving Toward $7—Good Business at Tide.

Anthracite—Taken from the dealers' standpoint the week has been a fairly satisfactory one, as moderately good shipments of all sizes have come in. This has been occasioned by the numerous embargoes which it has been necessary for the railroad companies to place against outside points, on account of freight congestion.

The dealers in this territory are well above their quota of tonnage, but at times this summer they may be almost flat, on account of the producers diverting coal to outside territories.

The wholesale price uncertainty continues, as the miners and operators have been unable to get together, although results may be expected at any moment.

The biggest producing company still continues to make shipments on a retroactive basis for May, and the retailers are compelled to adjust their retail figures so as to avoid any loss. On this basis the prices for stove and nut are closely grouped from $13.50 to $13.75 a gross ton delivered. Pea coal is running from $10.50 to $11.

There is a wide range of wholesale prices, shippers notifying customers that shipments are subject to prices in effect at time of shipment. The prices of one of the large companies still continue at $7.35 for egg, $7.70 for stove and nut and $6.00 for pea, per gross ton mines.

Among the more conservative individual shippers the price range is from $8.10 to $8.55 for egg, $8.45 to 8.80 for stove and nut, and $6.00 to $6.90 for pea. These prices are f.o.b. mines.

Stove and nut continue to be the most desired sizes. However pea coal continues in demand and the dealers now have little of this size on hand. There is also a growing demand for buckwheat coal for domestic consumption.

Most of the activity in the steam trade is still focused on buckwheat and the current production is rapidly absorbed. Big users of this size are storing every ton that they can get. Rice and barley are inclined to be somewhat laggard, although the companies are able to care for the production of these sizes.

One of the large producers this week added 25c. a ton to its buckwheat price, making its mines figure $4. Some independent shippers are selling at $4.10 and still others have advanced to $4.25.

Bituminous—There is absolutely no improvement in the soft coal trade and the consumers in this territory are badly in need of further supplies. The mines are still suffering from a car shortage, with no immediate hopes of relief.

Prices for soft coal, almost regardless of grade, are fast reaching record heights. Quotations are made of $7 per net ton at mines, although the bulk of the spot business this week has been done at figures between $6.35 and $6.75.

Gas coals are extremely scarce and even at quoted prices of $6.25 to $6.50 are hard to get. Many of the really big companies are entirely out of the market on spot business.

While prices may seem high, operators declare that when mines are operating only two days a week, the cost of production alone reaches close to $6. In addition they report the men are unable to exist on the wages of two and three days a week and that they quickly drift into other lines.

With no promise of improvement in the rail situation, producers look forward to an extremely active summer, with the present extreme scarcity running right into fall. Some operators, who have accepted the railroad company's offer of locomotive fuel, are getting a fair supply of cars. The roads are still extremely short of motive-power fuel.

BALTIMORE

Poor Car Supply Continues at Mines—Record Prices Hold for Bituminous—Pool Complications Cause Slow Loading of Vessels — Big Export Tonnage Shipped — No Change in Hard-Coal Situation.

Bituminous—The coal roads do not seem to be able to provide a good car supply at the mines. At the outset of the week things looked brighter with a 79 per cent general supply, an 83 per cent supply east of the Baltimore & Ohio and with both the Western Maryland and Pennsylvania reporting a better run of empties.

By the end of the week, however, there was a supply running around 40 per cent or less, with the eastern lines of the Baltimore & Ohio down as low as 32 per cent at times. With the export demand increasing, the strictly local situation had some trials, and prices for spot coal were held at a standard hitherto unknown in the bituminous trade.

Best steam coals readily command between $6.25 and $6.50 f.o.b. mines (the net ton), with medium to good coals selling over a range of from $5.50 to $6.00 and even the poorest grades of steam coal worth around $5 to $5.25 f.o.b. mines. Gas coals of run-of-mine character are around $5.25 to $5.50 and screened high-volatile fuels generally good for $6, mine basis the net ton.

A great export business is under way, the first 15 days of May showing a total loading on export of around 250,000 tons. At this writing there are, besides four boats at the Curtis Bay and Canton piers, about 30 ships awaiting astream to load around 150,000 tons of coal for foreign delivery.

Movement over the piers has been delayed by complications of the pools, which operate against quick vessel loading and dispatch in many cases. Despite this a world record was created the past week at the Curtis Bay pier of the Baltimore & Ohio, when the steamship Malden was loaded with 6,967 tons of bituminous coal in 2 hr. 44 min. an average of 2,548 tons an hour. The ship was cargoed for the New England Coal & Coke Co., for Boston delivery, and she received a total of 146 cars of coal in the time named.

Anthracite — Watchful waiting still marks the anthracite dealers' policy. A remarkably cool spring has made some unusually late small-order business. The dealers are forced to charge at least a dollar above the old winter schedule for coal they sell now, and take orders for future delivery at a price to be set at the time of delivery.

Lake

BUFFALO

No Improvement in Bituminous Situation—Coal Growing Quite Scarce—Strikes Keep Cars from Mines — New Prices Quoted — Anthracite Shipments Irregular—Little Lake Business—Coke Situation Strained.

Bituminous—The switchmen's strike continues and that means little movement of coal or any other freight. So far the roads have been able to organize crews and work enough coal through the yards to keep needed plants in operation.

Coal shippers consider that matters are growing worse, but it could not be much worse or all operations would have to stop. The wonder is that the effects of the strike have been withstood as long as they have.

Buffalo has been a strike center for a long time. The end must be nearer, but the worst may not have been reached. One reason why the employers hold out is that the public does not sympathize with the strikers.

As to prices the average shipper declares there are none and declines to make any quotation. Allegheny Valley, all sizes, is sometimes offered as high as $6 at the mines, but as a rule it is taken on contract and single sales are few. The same is true of Pittsburgh coal.

Anthracite—The supply to the city trade is small and shipments are irregular. There is no distress and consumers are slowly getting in their winter's supply. Reports from Scranton say that the miners are uneasy and may make trouble at any time.

Some of the distributors have put up their prices $1 a ton, but the larger companies have made no change, and do not appear likely to take any steps in that direction until it is known what the cost of mining is to be.

The Lake trade is still languishing on account of the short supply of anthracite to load into vessels and also because of the lack of steamer fuel. Twenty odd cargoes have been loaded and have mostly moved out of the harbor.

Coke—The situation is much strained. The big furnace companies have contracts enough practically to supply them, but the car movement is so uncertain that it is necessary to keep in close touch with the jobbers. Some furnaces are running at a slow rate and one or two have shut down; others get coal and coke by solid trains which get into the city without any switching.

Coke prices have advanced a little, being quoted in a nominal way at $15 for 72-hr. Connellsville foundry; $13.50 for 48-hr. furnace and $10 for chestnut in the domestic trade.

CLEVELAND

Improvement Noted, but Industries Operate on Curtailed Schedule—Spot Prices Around $5 at Mines—Lake Trade One-third Normal.

Bituminous—Steam-coal receipts in northern Ohio continue from 30 to 40 per cent of normal, apparently just enough to keep most industries operating on curtailed schedules. While the outlook still is bad, some improvement is noted, and the trade is unanimous in its belief that conditions can grow no worse on the railroads and must grow better, though gradually.

Users are pressing their demands more insistently than ever but operators continue to hold them off until the car-supply question becomes more certain. The spot coal dealers are able to pick up costs them $4.75 to $5, f.o.b. mines, with more at $5 than at $4.75, and a small tonnage reported going at $5.25.

The tendency of the whole price structure is upward. Operators who saw a slight weakness possible late in the summer, now can see nothing but strength. Domestic bituminous demands continue nil.

Pocahontas and Anthracite—Anthracite demand, while seasonably low, is greater than that for Pocahontas. Anthracite prices have not yet been advanced, but dealers threaten to do this almost weekly.

Lake Trade—The end of May likely will see the Lake coal trade a good 2,000,000 tons behind the 1919 season at the end of May. In April and May, 1919, Lake Erie docks dumped 4,714,040 tons of bituminous. In April this year the Lake Erie docks handled only 307,000 tons, and if May loading goes much over 1,500,000 tons Lake shippers will be surprised.

Every effort is being made to get No. 8 coal through to Lake Erie docks, solid trainloads being resorted to, but even this expedient is falling short. Preseason figures on Lake coal prices are being revised, and $3.25, mine, likely will prove the minimum this season, against $2.50 last year.

Prices of coal per net ton delivered in Cleveland by retail dealers are:

Anthracite — Egg, $12.20 @ $12.40; grate, $12.20@$12.40; chestnut, $12.50 @$12.70; and stove, $12.50.

Pocahontas—Shoveled lump, $10.50, and mine-run, $9.25.

Domestic bituminous—West Virginia splint, $9.50; No. 8 Pittsburgh, $7.75; Millfield lump, $8.50; and Cannel lump, $11.

Steam coal—No. 6 and No. 8 slack, $8.50; No. 6 and No. 8 mine-run, $8.50; and No. 8 ¾-in. lump, $8.75.

MILWAUKEE

Market Panicky — Water Receipts Relieve Somewhat, but Rail Conditions Not Reassuring — Coal Schedule Unchanged.

Harsh spring weather, coupled with slow receipts, kept the coal market at Milwaukee in a panicky state during the first half of May. Manufacturers expected that they would have to close down, and public utilities, such as the gas and electric companies, urged strict economy on the part of their patrons.

The arrival of several cargoes from the lower Lakes has served to relieve the tension to some extent, but reports of rail conditions from the mines to Lake points are not reassuring.

Business men are making every effort to put the coal supply on a more satisfactory basis. Milwaukee must get coal regularly and in increasing quantities, from now on until navigation closes, if a fuel famine is to be averted next winter.

Illinois coal is now being marketed at $7.50 for nut, $7 for mine-run and $6.50 for screenings, at the yards. Delivery calls for 75c. more. The general coal schedule remains unchanged.

Receipts by Lake thus far fall far short of last year's record, being 64,290 tons of hard coal and 65,331 tons of soft, against 130,237 tons of the former and 289,771 tons of the latter in 1919.

Inland West

COLUMBUS

Congested Traffic on All Railroads—Output in Ohio Mines Reduced to Low Point—Demand for All Grades—Strong and Active Bidding — Prices Advancing to New High Levels.

The coal-transportation situation is worse, and a further reduction in the output is reported from all mining sections. Traffic conditions are probably the worst in years. There is marked congestion at the various gateways and junction points due to the switchmen's strike.

As a result, many public utilities are about out of fuel. In the northern part of Ohio and in Michigan this condition is quite bad. Central Ohio consumers are better supplied. Efforts are being made to divert a limited amount to take care of the worst cases.

There is active bidding for Ohio and West Virginia coal. Hocking lump is being sold at much higher levels and the same is true of Pomeroy and Cambridge coals. Efforts of the larger producers to keep down quotations have proven unavailing and prices seem to have taken a sudden rampage. Many of the coal men deprecate the tendency of prices.

Retailers are practically out of fuel. There is no Pocahontas available in this territory as all produced is going to the seaboard. West Virginia splints are also scarce and Columbus retailers have to bid actively for a small allowance. These prices have shown the greatest jumps.

The large bulk of the coal supplied to domestic users in central Ohio comes from the Hocking Valley, Pomeroy Bend and Cambridge fields. Hocking lump is retailing from $7.50 to $7.75 and mine-run about the same price. Pomeroy lump is strong at $7.75 while mine-run is selling at $7.50, delivered. West Virginia splints are retailing from $8.50 to $8.75.

Steam trade is strong as practically every line of consumer is in the market for stocks. The Lake trade is held back because of congestion and car shortage and only a small tonnage has been loaded to date. Loadings at the Hocking Valley docks at Toledo are only about one-twelfth of the tonnage loaded last year at this time.

Prices at the mines of coals used in central Ohio are:

Hocking lump	$4.25 to $4.75
Hocking mine-run	4.00 to 4.50
Hocking screenings	4.00 to 4.75
Pomeroy lump	4.25 to 5.00
Pomeroy mine-run	4.00 to 4.75
Pomeroy screenings	4.00 to 4.75
West Virginia splints, lump	5.50 to 6.00
West Virginia mine run	5.00 to 5.75
West Virginia screenings	5.00 to 5.75
Pocahontas lump	5.50 to 6.50
Pocahontas mine-run	5.50 to 6.25
Pocahontas screenings	5.50 to 6.25

CINCINNATI

Improvement in Coal Receipts as Transportation Difficulties Disappear—Market Firm on All Grades of Coal—Winter's Supply Going In.

Shipments of coal to the Cincinnati market showed an improvement the past week, owing to the gradual betterment of the car shortage as the result of the end (locally) of the switchmen's strike. As a consequence coal men are breathing easier. The market on all kinds of coal continues firm, and industrial users are finding less difficulty in obtaining their necessary supplies. There is increased production in the West Virginia fields and this situation will soon make itself felt in the local market.

Retail dealers have all the business they can handle. Domestic consumers have come to the conclusion that there is to be no letdown in prices, and consequently they are putting away their winter's supply.

The prospect of quite a serious shortage of gas for Cincinnati, forecast by the fight now on in the courts to keep the supply of natural gas going out of the state of West Virginia (from which territory Cincinnati is supplied) has proved a boon to the coal trade; wherever Cincinnatians have depended on gas for heating purposes, it is safe to say that there will be a good supply of coal on hand to offset any discomforts, should the gas give out.

ST. LOUIS

Coal Situation Growing More Acute—Little Work at the Mines in All Fields—Railroads Short of Fuel—No Change in Retail Prices.

The little improvement that was noted previous to a week ago was apparently temporary. In the last week conditions have been growing worse, at times have been acute and have threatened to become more so not only in St. Louis, but in the entire country adjacent.

The Southern Ry. has no crews at work at all. Most of the other trunk lines have the majority of their men back, but the terminal is tied up. The strikers have gone to work in other lines and were the strike to be settled today, there would be a shortage of men.

The Missouri Pacific is trying to force the operators to sell coal to the railroad at $2.60 and many of the operators will shut their mines down before they will be forced into this. The result is that the Missouri Pacific is buying hundreds of cars in the Standard field.

The Chicago & Eastern Illinois has closed its contracts for mine-run at $2.85 f.o.b. mine. Other railroads are buying in the open market, both in the Standard and Carterville fields at from $2.75 to $3 for mine-run.

Standard coal is selling at $4@$4.50 for lump and egg, from $3.75@$4.25 for mine-run and about $3.25@$3.50 for screenings. The Mt. Olive operators are maintaining their regular prices of about $3@$3.25 for domestic sizes and their mine-run and screenings are going on contracts.

DETROIT

Shipments of Smokeless Small and Irregular — Little Coal Arrives from Central Competitive Field — Public Utilities in Distress — Railroads Use Coal Equipment for Other Freight—Interstate Commerce Commission Appealed To.

Bituminous—With the market practically without free coal, wholesalers and jobbers find themselves in the position of meeting an active demand at high prices, without being able to provide coal. Except for shipments under contract, there is said to be almost no West Virginia or Kentucky coal arriving. The product from those districts now commands so high a price at tidewater markets, that consumers in Detroit and throughout Michigan cannot afford to meet the competition.

Coal from Ohio is arriving in small amount and a little coal is reported coming from Illinois and Indiana. For Ohio coal the nominal prices at the mines on short tons are about $5 for lump; $4.75 to $5 for mine-run and $4.75 for slack. West Virginia lump is reported selling at the mines at about $6, to which cost of delivery in Detroit would add more than $2.

At a conference with the Michigan Public Utilities Commission in Lansing, May 13, representatives of the utility companies placed the blame for their failure to get coal on the use of coal equipment of the railroads for movement of other forms of freight.

Anthracite—Receipts of anthracite are quite small and infrequent. Stocks in the yards of most dealers are exhausted, while the continuance of cold weather creates an active inquiry from household consumers.

CHICAGO

Little Improvement in Coal Receipts and in Strike Situation — No Eastern Coal Received on Account of Embargoes.

Chicago has been receiving some coal lately, although in quite small quantities. The prices obtained here are about the same as those maintained elsewhere in the Middle West, as good coals are being sold at circular prices which are reasonable, while fancy prices are being obtained for off-grade stuff.

The Chicago trade has been forced to run along during the past three or four weeks without any Eastern coal, as those who were fortunate enough to contract for Eastern coal earlier in the season have been unable to get their tonnage, on account of the fact that most of the Eastern terminal points have been embargoed.

South

LOUISVILLE

Car Supply Improves — Western Kentucky Prices Higher, Due to Strong Demand—Eastern Kentucky Well Sold Up and Prices Firm—River Shipments Quiet.

The car supply as a whole has been better for May, with mines working at least part of three days, and car supply reported at around 45 to 50 per cent; whereas the April supply was only about 30 per cent on Louisville & Nashville lines in the state. Empties are moving back to the mines, while embargoes are holding movement to Northern points in check.

Western Kentucky prices at mines today are higher than ever before, and still advancing. Western Kentucky block coal is quoted at $3.50@$3.75 a ton; mine-run, $3.25@$3.50; nut and slack, $2.80@$2.90; and pea and slack, $2.60@$2.75. Screenings are in heavy demand at fancy prices.

Eastern Kentucky is well sold up, and has little coal to offer. Prices as a whole are firm, while there is practically no differential between steam and block, or mine-run and screenings, as all grades are in good demand. Prices on Eastern Kentucky coals average from $5.50@$6.25 a ton for all varieties.

A few mines are billing out block at not more than $4.50 a ton, others getting full $6.25. There is also practically no differential between Hazard non-byproduct coals and Harlan byproduct coals today. No trouble is experienced in selling good byproduct mine-run at $6.25 a ton.

River shipments are rather quiet as a whole, although a few barges have been received during the week. River shipments for the year have been larger than during the previous two seasons.

BIRMINGHAM

Trade Restricted Only by Transportation Facilities — Inquiry Strong for Bunkering and Export Trade — Warrior River Moves Considerable Coal.

The local coal market is restricted only by the inability to get the necessary equipment to the mines for the movement of fuel. The supply of coal coming from the mines has to be prorated to customers and, therefore, only a limited amount of new business can be taken on.

Due to the large increase in the number of ships calling at Southern ports and boats sailing from Mobile, Pensacola and New Orleans, much bunkerage coal is now being sought in this market. Foreign interests are also in the market inquiring for a considerable tonnage.

Cars are not available for transporting export coal to shipside. But operators, whose mines are accessible to the Warrior River, are moving considerable bunker coal to Southern ports, 24,420 tons leaving the Warrior field one day the past week.

Prices as a whole are being held in check, though conditions are such as to bring about a runaway market. Quotations are practically without change since last week.

Canada

TORONTO

Coal of All Grades Scarce—Canadian Railways Demand Prepayment of Freight—Dealers Refusing Orders.

Little coal, either hard of soft, has been received during the present week, owing to the railroad embargo which held up shipments at Black Rock. The only consignments to come forward were a few carloads which had previously entered Canada.

The cause of the difficulty is the refusal of the Canadian railways to haul coal unless the freight is prepaid to destination in American funds, including the Canadian end of the haul.

Supplies on hand, especially of bituminous, are quite light and dealers are refusing orders. Consumers are unable to lay in supplies for the season ahead, such orders as have been booked being taken at the price prevailing at time of delivery.

Nominal quotations for short tons are as follows:

Retail (anthracite) egg, stove, nut and grate	$14 00
Pea	12.50
Bituminous steam	11.00
Domestic lump	12.50
Cannel	14.00

News From the Coal Fields

Northern Appalachian

FAIRMONT

Production Decreases During First Week of May — Railroads Unable To Move Coal—Assigned Cars Cut Down Commercial Fuel.

Instead of bringing any relief from the car shortage, the first week of May witnessed a further decrease in the supply, mines faring much worse than they had during the last week of April. During the first three days of the week, the Fairmont region had only 2,630 cars as against 3,247 cars received during the first half of the week ended May 1.

Similar conditions prevailed in other fields. It was the old story of a lack of cars and it forced a suspension of operations at a number of mines scattered throughout the northern part of the state, materially reducing production.

Failure of the Monongahela mines to secure more cars was due to the fact that while the Pennsylvania had been able to move coal consigned to points on its own lines and the connection from Brownsville, on the other hand the Pittsburgh & Lake Erie was not able to move any coal during the week, there being an accumulation of about 1,300 cars at the point named throughout the week.

The large number of assigned cars used by the Baltimore & Ohio during the week quite materially reduced the number of cars available for the loading and shipments of commercial fuel. Notwithstanding the rather acute shortage, the railroads managed to secure about 25 per cent of production, leaving a small output for commercial shipment, commercial coal therefore being quite scarce.

While during the early part of the week ended May 8 Curtis Bay shipments were fairly large in volume, such shipments diminished in size during the latter part of the week partly because fuel for this port could only be shipped under permit. Port Richmond was embargoed during the greater part of the week. Western shipments increased somewhat in volume from northern West Virginia points, yet little coal was shipped to Lake points, since shipments to such points could be made only under special permit.

Little credence was given a rumor, freely circulated in northern West Virginia fields during the first week of May, that the Fuel Administration was to be resurrected and was to be given plenary powers as to prices. As far as could be learned, such a rumor was started in Philadelphia, but was believed to have been inspired for the effect it might have on prices.

PITTSBURGH

Coal Movement No Better, in General—Loads Moved, but Empties Not Returned — River Shipments Heavy — Market Irregular.

The rail strike has been waning, in general, and there are more points to which shipments can be made. On the other hand cars have grown scarcer; the net result is that there is no better coal movement than formerly—if indeed the movement is as good.

The Pennsylvania and Baltimore & Ohio are now relatively free, shipments being possible to the majority of points on these lines, though subject to delays, sometimes more or less interminable. The Pittsburgh & Lake Erie is still doing little, though there has been a slight improvement on this line. The Bessemer road has almost gone out of commission.

The car shortage is due chiefly to two influences: First much more attention is being paid by the railroads to moving loaded cars than to returning empties. Second a considerable proportion of loaded cars are stalled on sidings, thus tying up equipment completely. River shipments continue quite heavy, and Pittsbugh appreciates the Monongahela River much more than ever before.

The coal market has become quite irregular, some quite fancy prices being paid, particularly to brokers. Leading coal operators endeavor to hold the market within reasonable limits, but are not entirely successful. The market is quotable roughly at $3.75@$4 on contract and $4.50@$5 for spot, per net ton at mine, Pittsburgh district.

CONNELLSVILLE

Production Rate Practically Unchanged—Spot Furnace Coke Advances $2—Solid Trains Move Fuel—Car Supply Scant.

Coke production in the Connellsville region is running along at about the same rate as in the past three or four weeks, or about 70 per cent of the rate obtaining before the rail strike began. There are more lines of communication open for the shipment of coke, though much territory is still shut off.

The result of the widening in the field has been to bring more possible buyers into the market, and as offerings are no heavier the market has stiffened. Furnace coke for spot shipment advanced $2 a ton.

Foundry coke prices are, in the main, held down by the policy of leading operators who do not wish to exact profits (at this time) materially greater than were obtainable before the rail strike began; but some brokers have secured altogether unusual margins in handling single carloads of foundry coke.

The market is quotable at $14 for spot furnace coke and $12@$14 for spot foundry, contract foundry being $11@$12, all prices per net ton at ovens, Connellsville region. Some furnaces bid only $12 for furnace coke, preferring to bank rather than pay a higher price.

Estimates of Production

FROM THE WEEKLY REPORT OF THE GEOLOGICAL SURVEY

BITUMINOUS COAL

	1920 Week	1920 Calendar Year to Date	1919(a) Week	1919(a) Calendar Year to Date
April 24b	8,459,000	166,189,000	7,378,000	133,519,000
Daily average	1,410,000	1,692,000	1,223,000	1,358,000
May 1b	8,896,000	175,085,000	8,022,000	141,541,000
Daily average	1,483,000	1,679,000	1,337,000	1,357,000
May 8c	9,069,000	184,153,000	8,438,000	149,979,000
Daily average	1,511,000	1,670,000	1,406,000	1,352,000

(a) Less one day's production during New Year's week to equalize number of days covered for the two years. (b) Revised from last report. (c) Subject to revision.

ANTHRACITE

	1920 Week	1920 Calendar Year to Date	1919a Week	1919a Calendar Year to Date
April 24	1,618,000	25,900,000	1,435,000	23,401,000
May 1	1,792,000	27,692,000	1,717,000	25,118,000
May 8b	1,848,000	29,540,000	1,782,000	26,900,000

(a) Less one day's production during New Year's week to equalize number of days covered for the two years. (b) Subject to revision.

BEEHIVE COKE

United States Total

Week Ended May 8 1920c	Week Ended May 1 1920b	Week Ended May 10 1919	1920 to Date	1919 to Date a
353,000	359,000	261,000	7,727,000	7,664,000

(a) Less one day's production during New Year's week to equalize number of days covered for the two years. (b) Revised from last report. (c) Subject to revision. All figures in net tons.

Middle Appalachian

POCAHONTAS AND TUG RIVER

Idleness at U. & W. Mines Worst of Last Twelve Months—Solid Trains Going West, Empties Coming Back, but Diverted to Various Points—Tonnage Going to Tide and Inland East.

Idleness among the mines on the Norfolk & Western was most marked during the first week of May, conditions being on a par with those of the last week of April—the poorest production week since the early spring of 1919. Owing to a scarcity of equipment, mines were limited to about a 40 per cent output.

As many points in the West were still embargoed, except as to solid train movements, it became necessary to forward the largest percentage of the Southern fields to tidewater and Inland East points. Scarcely any coal has been shipped so far this season to the Lakes from southern West Virginia fields. Coke shipments were slightly larger in volume to Western markets during the first week of the month.

Stagnation was still observed in the Pocahontas field, owing to car shortage, such losses alone far outweighing total production. It was from the East that most empties were coming. This resulted in much idleness at mines, few plants being able to work more than two days at the most during the entire weekly period.

During the first week of May, Tug River mines were still feeling the effect of the "outlaw" strike, since there were not many more cars in the region than there had been in the closing week of April. As a result there was a production not much in excess of 40 per cent at any mine. Some operations were producing coal only during two full days out of the six. Such coal as was produced, for the most part was forwarded to Eastern points, the bulk of it going to tidewater.

One factor causing heavy Eastern shipments was the higher prices offered for delivery at tidewater. The volume of coal for the Lakes from the field was not large, no shipments being permitted until May 7.

Embargoes on high-volatile shipments affected the Thacker district to some extent at the outset of May, though it was possible to ship to some pools under special permit. There was still a marked shortage of cars in the Williamson field, the output being about 50 per cent of normal.

NEW RIVER

Little Coal Shipped West—Many Markets Embargoed—New River Coal Sent East for Bunker and Export—Virginian Mines on Gulf Work Four Days Out of Six.

Improvement in conditions in this area during the first week of May was so insignificant as to be negligible, all mines being short of cars throughout the week. The shortage, which has been in evidence since the first of the year, continued to be aggravated by conditions in the West.

It was neither possible to ship much coal to Western markets nor to secure any cars to speak of from Western points; many markets were still embargoed during the greater part of the week as far as West Virginia shippers were concerned. Production in the New River field, during the first week of May, reached little more than 100,000 tons.

Coke was being consigned to Western markets from the New River field in larger quantities than had been true as to the latter part of April. The bulk of New River coal was being routed to tidewater for bunkering and export purposes, though Inland East markets were securing a limited quantity.

Mines in the Winding Gulf district were probably comparatively little affected by the car shortage in the period between May 1 and May 8, owing to the fact that the Virginian Ry. succeeded in furnishing the mines on its lines with a larger quota of cars than was the case on other railroads in southern West Virginia. Mines on the Virginian were able to operate about four days out of the week or approximately 66 per cent. Mines in the same district on the Chesapeake & Ohio, however, were not so fortunate, having only about a two-day supply, being limited therefore to about a 35 per cent output. Virtually the entire output of the Winding Gulf field was shipped to tidewater.

LOGAN

Tonnage Increases in Guyan Field—Mines Still Operate Below 50 Per Cent of Capacity—Western Shipments Limited, Tonnage Goes to Tide.

With cars somewhat more plentiful in the Guyan field, there was a slight tonnage increase in the opening week of May in that region, production reaching approximately 175,000 tons, a gain of about 20,000 tons. So few cars were available, compared with the requirements of the mines, that heavy losses in production were being entailed; there being a loss due to a shortage of equipment of about 225,000 tons.

Even making allowances for the somewhat better car supply, mines were still being operated below 50 per cent of potential capacity and it was not possible to more than meet contract requirements. Hence there was little free coal available.

Of course with many Western markets embargoed, except under special permit, Western shipments were necessarily limited. But even aside from such embargoes, there was such a heavy demand at tidewater that little coal was available for Western shipment.

Effective May 6, Pools 5, 6 and 7 at Newport News were closed to high-volatile shipments from the Logan and other high-volatile fields, permits being issued only as the arrival of vessels justified. Lake buyers were still experiencing difficulty in securing coal, and there was not a particularly large tonnage movement to Lake points.

During the month of April only 647,952 tons of coal were produced in the Logan field, that being only 28 per cent of potential capacity. Total losses from all causes during the same period amounted to 1,188,561 tons, or 61.8 per cent, with transportation disability being responsible for the loss of 1,149,301 tons or 58.6 per cent.

KANAWHA

Dearth of Cars for C. & O. Kanawha Mines—Mines on K. & M. Better Off—Output Goes East.

There was a dearth of equipment for Kanawha mines from the very beginning of the week ended May 8, the shortage becoming more pronounced as the week grew older. In short, only 88,000 tons of coal were produced at Kanawha mines, excluding Coal River territory and Kanawha & Michigan territory, during the week ended May 8.

The major part of the output continued to be moved to Eastern markets, but tidewater shipments were somewhat under those of the previous week, owing to embargoes applying to high-volatile coal. Western shipments were increased somewhat, partly under special permission. Lake shipments were comparatively insignificant although there was strong pressure for coal at lake ports. Prices were still high but it was rather believed the crest had been reached.

NORTHEAST KENTUCKY

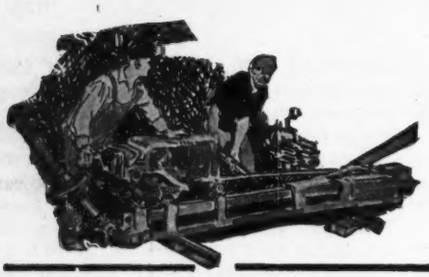
Transportation Improves and Output Increases Slightly—Mines Operate Half Time—Some Lake Trade and Much Tide and Southern Tonnage.

Improvement was shown in transportation facilities afforded mines in northeast Kentucky during the first week of May, and consequently production in that period was somewhat larger than during the final week of April. However, the increase in the percentage of production was rather small, there being still a loss of more than 50 per cent.

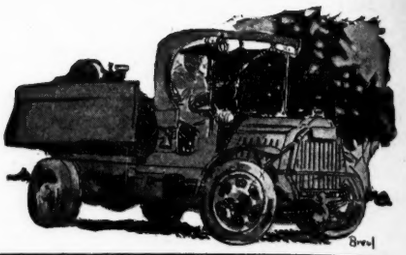
Few mines were able to operate more than half the week, and in a majority of instances operations were limited to about two and a half days out of the six. More cars were available for mines on Big Sandy and on the Sandy Valley branch of the Chesapeake & Ohio. There was no further improvement, however, during the the first half of the second week of May.

It was possible to move more Lake coal than had been the case during April, since switching in yards could be avoided. Much northeast Kentucky coal, however, was still being moved to tidewater and to southern markets.

Little spot coal was available during the first week of May, since northeast Kentucky mines found it impossible to even keep pace with contract requirements, the demand in fact far outstripping the supply.



Mine and Company News



ILLINOIS

Chicago—The Allen & Garcia Co., of Chicago, have been employed by the American Smelting & Refining Co. as engineers for the design and construction of a thoroughly modern complete coal mining plant near Rosita, State of Coahuila, Mexico. The smelting company controls approximately 35,000 acres of coking coal land and expects to use the output of the mines for coke making in connection with their smelters. Messrs. J. A. Garcia and Andrews Allen leave shortly for Mexico to make examination of the properties and arrange for the preliminary surveys, shaft sinking, etc.

The rapid strides which the Roberts & Schaefer Construction Co., of Chicago, is making toward the completion of the new plant (including a steel tipple) at the Sunnyside mine of the T. G. Ward Co., in Williamson County, indicate that the mine will probably be able to resume operations not later than the middle of May. The new tipple, which is to replace the one destroyed in a recent fire, will have many new and modern improvements over the old one.

Rumors of one of the largest mine mergers in the history of Illinois have been circulated lately. The Union Fuel & Ice Co., of St. Louis, plans to control in the neighborhood of 85 mines located mostly in St. Clair and Madison counties. The company has lately bought out and consolidated five or six of the small fuel firms in St. Louis. It is stated that the idea is to centralize the industry in the Standard field, reduce the number of small operators and stabilize production and the marketing of coal. This can be done by buying many of the smaller mines throughout the state and controlling them under one head. John Taylor, of Belleville, formerly at the head of one of the largest and oldest coal companies in southern Illinois, is one of the preliminary promoters of the scheme.

NEW YORK

New York—Plans are under way calling for a merger of Burns Brothers, William Farrell & Sons, Inc., and the United States Distributing Company. S. M. Shatzkin, former vice-president of Burns Brothers and an organizer of both that and the Farrell company, is active in promoting the merger, which will take in a number of other smaller coal companies. Directors of the Burns and Farrell companies met on May 11 and 12, respectively, at which time the proposed merger was considered and approved.

KENTUCKY

Bulan—The Tracer Fork Coal Mining Co., Lexington, Ky., is planning for the immediate development of a tract of about 1,500 acres of coal properties in the vicinity of Bulan. It is proposed to have an initial output of approximately 200 tons, this capacity to be increased at a later date. The company recently increased its capitalization from $30,000 to $100,000, to provide for the proposed expansion. John R. Pates, 1304 Fayette Bank Building, Lexington, Ky., is secretary.

OHIO

Columbus—The complete statistical report of the Ohio Industrial Commission has been made public and covers production during the year 1919. This report shows that there were 33,934,737 tons produced in 1919 as compared with 47,849,236 tons in 1918. The records of other previous years are: 41,677,986 tons in 1917; 34,526,552 tons in 1916; 22,627,046 tons in 1915; 18,736,407 tons in 1914 and 36,285,468 tons in 1913. Of the total production in 1919, 30,154,485 tons were machine mined; 2,439,975 tons were pick mined and 1,340,277 tons were stripped. Belmont County, as has been the case for several years, was the leader with a production of 9,876,953 tons. Athens County was second with 5,141,582 tons; Jefferson County was third with 4,575,054 tons and Guernsey County fourth with 3,340,815 tons. Other counties which had a production of 1,000,000 tons or more were: Harrison, 1,374,407 tons; Hocking, 1,144,963 tons; Perry, 2,477,468 tons and Tuscarawas, 1,376,164 tons.

Athens—A deal has been closed whereby the Hocking Valley Mining Co. has purchased a 2,000-acre tract, north of this place, from the Lorain Coal & Dock Co. The consideration was in the neighborhood of $225,000. The operations were abandoned about ten years ago, but it is planned to reopen them, to build a modern tipple and employ about 300 miners.

OKLAHOMA

Muskogee—The Southwestern Coal & Coke Co., which recently incorporated with a capital of $250,000, has perfected its organization and is understood to be arranging plans for the development of a total of about 2,000 acres of coal properties in the vicinity of Muskogee. Machinery and equipment will be installed. John Wheeler, and E. R. Nagle, both of Muskogee; and H. A. Boyles, Wichita Falls, Tex., are connected with the company.

Carbon—The Carbon Fuel Co., which recently increased its capital from $250,000 to $1,250,000, for general expansion, is planning for the development of a total of about 1,500 acres of coal properties in the vicinity of Carbon. The company's plans include the construction of a large new steel tipple as well as the installation of a new conveyor system. J. R. Thomas is president; W. W. Chapman is construction engineer.

PENNSYLVANIA

Ashland—Three miners were killed at the Bast colliery recently when the cage in which they were riding was overhoisted and they were hurled down the shaft. The victims were Harry Snyder, 35 years; Thomas Kilroy, 47; and Patrick Neary, 48. John Dombrowsky, a fourth occupant, clung to the cage and escaped injury.

The men had completed their shift in the mine and signalled the engineer to be hoisted to the surface. The cage failed to stop at the usual landing place and the engineer reversed the engine. The cage continued to ascend, however, until it reached the sheave wheels, where it stuck for an instant, and then dropped suddenly the length of the rope, which had become slack. The sudden stop threw the three men off the cage, but Dombrowsky held on.

Snyder fell to the bottom of the shaft, a distance of 1,200 ft.. and Kilroy and Neary to the shaft surface landing, a distance of 50 ft. Snyder was killed instantly and Neary died while being taken to the State Hospital at Fountain Springs.

TENNESSEE

Central City—The Gibraltar Coal Mining Co., of Memphis, Tenn., is understood to be having plans prepared for increased operations at its local mining properties. The work includes the sinking of an additional shaft, the installation of machinery and equipment, the erection of a new steel tipple, as well as the construction of a number of miners' houses. It is proposed to have a capacity of about 2,000 tons daily.

WEST VIRGINIA

Ivaton—The Ivy Branch Coal Co., which recently increased its capital to $100,000, is having plans prepared for extensive improvements at its plant, to provide for increased output. It is proposed to install new shaker screens, build an additional railroad siding, and erect a number of miners' houses. The daily output from this plant is to be in excess of 500 tons. Leo F. Moore is superintendent.

Lewisburg—The Nelson Fuel Co., recently organized, is arranging for the immediate installation of machinery and equipment in connection with the proposed development of about 2,500 acres of coal lands in the Lewisburg district. John B. Laing is president.

Bellwood—The Imperial Smokeless Coal Co., recently organized, is having plans arranged for the development of about 1,200 acres of coal lands in the vicinity of Bellwood. It is proposed to install machinery and equipment for a daily output of about 1,000 tons. W. S. Wood, Charleston, is president; H. H. Blackburn, Fire Creek, is vice president; and J. Wade Bell, Bellwood, is manager. Headquarters of the company are at Charleston.

Association Activities

Engineering Advertisers' Association

Engineering Advertisers' Association members discussed at length the bill proposed by C. J. Thompson (Representative in Congress) to tax advertising, at its monthly meeting recently at the Great Northern Hotel, Chicago, Ill. It was unanimously agreed to enter a vigorous protest against this proposed legislation as being unsound and unfair to business. It was said that the passing of such a bill would tend to curtail the advertising of some manufacturers, which would cause more or less depression in business, and as the crying need of the hour is for more production, it would be unwise to interfere with business now by passing the proposed tax bill. The members of the Engineering Advertisers' Association represent about one hundred of the leading manufacturers of engineering products in the Middle West and their opinions on such an important subject should be seriously considered.

Preston County Coal Operators' Association

There is a move on foot among the operators of Preston County, W. Va., to have the Preston County Coal Operators' Association merged into the Northern West Virginia Coal Operators' Association, a meeting of the first mentioned organization having been held at Kingwood, during the latter part of April, for the purpose of considering the question of affiliating with the larger association. Before taking any definite action it was decided to canvass the operators of the field and learn the wishes of individual members, a committee being appointed for that purpose. Should a favorable report be submitted by the committee, it is believed the Preston operators will join the Northern association. George T. Bell, executive vice-president of the Northern association, was present at the meeting to speak of the advantages to be derived from membership in the larger organization, of which he is an officer.

West Virginia Freeport Coal Operators' Association

The West Virginia Freeport Coal Operators' Association has dissolved. Resolutions to this effect were adopted and ordered at a meeting of the association held at Kingwood, W. Va., on April 29. Resolutions were also adopted by which members of the old organization were requested to join the Northern West Virginia Coal Operators' Association, with headquarters in Fairmont.

Mine Owners' Association of Kentucky

The Mine Owners' Association of Kentucky held its bi-annual meeting at Louisville on May 4, at which time officers were elected for a period of two years as follows: Frank D. Rash, president of the St. Bernard Mining Co., was re-elected president; J. D. Francis, of the Pond Creek Coal Co., vice-president; D. B. Cornett, of the Harlantown Coal Co., vice-president; W. H. Cunningham, of the Twin States Fuel Co., secretary-treasurer.

What Happened in April

[The bracketed figures in the text refer to the number and the page of the volume in which references to the matter noted may be found, and should the reader desire further information he can obtain it in the place indicated].

April 2—In eastern Ohio, 3,000 coal-mine workers strike [XVII, 723].

April 3—Federal district attorneys are instructed by Attorney General Palmer to receive and consider complaints of profiteering in bituminous coal [XVII, 723].

April 5—Some 2,000 Kansas mine workers go on strike against wage decision [XVII, 723]—Judge T. J. McGinnis, at Beckley, W. Va., sentences Tony Stafford to serve a term in the penitentiary, as ringleader of gang shooting up mines of E. E. White Coal Co. [XVII, 759].

April 6—Attorney General Hopkins, of Kansas, summons the presidents of all the Kansas local unions of the United Mine Workers of America to appear in the new Court of Industrial Relations [XVII, 723]—Alexander Howat, president of district No. 14, United Mine Workers of America, refuses to obey summons to appear before Industrial Relations Court of Kansas [XVII, 774].

April 7—Amicable agreement is reached by scale committees of Kanawha, W. Va., field operators and miners, beginning on this date [XVII, 835]—Herbert Hoover addresses New York section of American Institute of Mining and Metallurgical Engineers [XVII, 775].

April 7 and 8—Canadian Retail Coal Association holds its Sixteenth Annual Convention at Toronto, Canada [XVII, 761].

April 8—Large flat rate increases granted in New River, W. Va., district at joint scale meeting held in Charleston [XVII, 835]—Judge Lewis of U. S. District Court, restrains U. S. attorney from presenting evidence to Grand Jury investigating charges of profiteering by Colorado Coal Co. [XVII, 836].

April 9—Alexander Howat and associates, of Kansas district United Mine Workers, are arrested and sent to jail to stay there until they consent to appear as witnesses before the Industrial Relations Court [XVII, 774].

April 11—Elias Rogers, prominent coal operator of Canada, dies at his home in Toronto [XVII, 821].

April 12—Bids for coal for the Government departments in Washington, D. C., for coal year beginning April 1, 1920, are opened by the chief engineer of the Government fuel yards [XVII, 863].

April 13—Sessions of 22nd Annual Convention of United Mine Workers of America, of Fifth subdistrict of Ohio, begin at Bellaire, Ohio [XVII, 836]—First meeting of joint board of coal operators and mine workers of New River, W. Va., field is held at Thurmond, W. Va. [XVII, 868].

April 15—Miners' Federation of Great Britain agrees to accept the Government offer of a 20 per cent increase on gross earnings [XVII, 840].

April 17—Contract is concluded between mine workers and operators of northern West Virginia fields—district 17, United Mine Workers of America [XVII, 866]—After six-day session, sub-district 5 of district 6 (Ohio) votes to bar anyone from office who had not been five years a member of the organization [XVII, 866].

April 19—Justice Bailey, of Supreme Court of District of Columia, hands down decision, in case of Maynard Coal Co. vs. Federal Trade Commission, holding that the commission had no authority to require reports from coal operators concerning cost of production, etc. [XVII, 809].

April 20—Second annual meeting of Industrial Car Manufacturer's Institute is held in Pittsburgh, Pa. [XVII, 869]—A new wage scale is granted to the mine workers of northern West Virginia and accepted by representatives of the United Mine Workers of America and the scale committee of Northern West Virginia Coal Operators of America [XVII, 953].

April 21—H. M. Payne speaks for group representing manufacturers of coal and oil, at luncheon of American Manufacturers' Export Association, held at Hotel Pennsylvania, New York, N. Y. [XVII, 953].

April 22—Public hearings begin on Senator Frelinghuysen's coal bills [XVII, 834]—Because of inability of miners and operators to agree, a special scale committee of ten operators and ten miners, appointed to consider demands, begins its sessions [XVII, 953].

April 26—U. S. Supreme Court sustains the Government's charges of illegal combination against the Reading company because of its holdings in various coal companies and in roads. The combination was held to be a violation of the Sherman anti-trust act and was ordered to be dissolved [XVII, 840].

April 27—Anthracite operators' scale sub-committee makes counter proposal to mine workers' representatives [XVII, 952]—After sessions continuing over period of three weeks, representatives of Central Pennsylvania bituminous operators and mine workers agree upon and sign a wage agreement, for period of two years [XVII, 947].

April 27-29—Business men from all parts of the country gather at Atlantic City, N. J., under auspices of Chamber of Commerce, to make study of means to stimulate production in industry [XVII, 834].

April 28—Offer of operators (April 27) is rejected by wage-scale committee of the mine workers after consideration at Continental Hotel [XVII, 952].

April 30—Judge A. J. Curran, of Crawford County District Court, declares the new Kansas Court of Industrial Relations to be constitutional [XVII, 954].

Personals

John A. Douglas, formerly superintendent at the Page mines for the Loup Creek Colliery Co., has accepted the position as general superintendent for the Brush Creek Coal Co. over all their mines on the big coal in Boone County.

Everett Drennen, of Elkins, W. Va., has been elected president of the West Virginia Coal Co., operating in West Virginia. Mr. Drennen, however, will continue to have his headquarters at Elkins, where he has been located for the last three years having been selected as vice president and general manager of the W. Va. Coal & Coke Co., when that company succeeded to the holdings of the Davis Colliery Co. Mr. Drennen has long been active in the affairs of the Northern West Virginia Coal Association, the West Virginia Coal Association and the National Coal Association.

George H. Baker, of Central City, Ky., for many years identified with the United Mine Workers of America, has resigned from that organization and become secretary of the Western Kentucky Coal Operators' Association. This closed 13 years of active service with the mine workers. He was elected state senator in Western Kentucky, and is now planning to run for Congress.

W. Guy Srodes, of Charleroi, Pa., has resigned as general superintendent of the Diamond Coal & Coke Co., of Pittsburgh, Pa., effective April 1, and was succeeded by E. A. Siemon, of Brownsville, Pa., chief engineer of the same company. As J. H. Hillman, Jr., of Pittsburgh, Pa., recently obtained control of the Diamond company and was elected chairman of the board, and Tracey W. Guthrie, president of the Hillman Coal & Coke Co., was made president, it is likely that the operating managements of the two companies will soon be merged, in fact, it is rumored that this will take place July 1.

John A. Penton, president of the Penton Publishing Co., was elected a director to fill the vacancy on the board of directors of the Wellman-Seaver-Morgan Co., caused by the death of Samuel T. Wellman. Mr. Penton has an intimate knowledge of the iron and steel trade and a wide acquaintance with prominent people in all lines of industry in this and many foreign countries.

H. P. Sweeny, who has been superintendent of the Fort Montgomery Iron Corporation mine at Fort Montgomery, N. Y., for the past four years, has resigned, effective May 1. His successor has not yet been appointed.

T. F. Diefenderfer has been elected secretary of the Northwestern Coal Operators' Association. This organization has its headquarters at Butler, Pa., in the county of the same name as the town, a county adjacent to and directly north of Allegheny County.

Henry Schoch, sales engineer of the General Briquetting Co., has been elected vice president of the Nukol Fuel Co., of Ontario, Canada, and will take up his work for that company with headquarters in Toronto on May 17. The Nukol Fuel Co. is manufacturing a high-class anthracite briquet for the Ontario market. One plant is operating in Toronto, another is in course of construction at Port Stanley, and three more are prospected within the next two years.

E. G. Lewis, formerly manager of the Cleveland office of the Bucyrus Co., of South Milwaukee, Wis., has been appointed central sales manager of this company, with headquarters at 622 McCormick Bldg., Chicago. He will succeed E. C. Hingston who has resigned. The Cleveland office, which was opened by the company on Sept. 1, 1919, will be continued under Mr. Lewis' jurisdiction.

DeWitt V. D. Reiley, formerly vice president of the Davis-Bournonville Co., Jersey City, N. J., was elected president of the company at a recent meeting of the directors, succeeding Augustine Davis, who resigned last November. **Charles B. Wortham,** treasurer of the company since its organization, was elected vice president, and **William G. McCune,** secretary and treasurer. The directors are DeWitt V. D. Reiley, Charles B. Wortham, William G. McCune, Augustine Davis, Charles J. Mayer, Daniel E. **Evarts** and H. Rowntree.

Industrial News

Philadelphia, Pa.—The Harrison Safety Boiler Works, which has been carried on for many years as a co-partnership by Joseph S. Lovering Wharton, William S. Hallowell and John C. Jones, has been incorporated under the laws of the state of Pennsylvania as the H S B W—Cochrane Corporation with the following officers: Jos. S. Lovering Wharton, president; John C. Jones, vice president and general manager; William S. Hallowell, secretary-treasurer; Horace E. Sibson, general sales manager; Axel B. Wallem, general works manager. The new corporation takes over the entire business of the former firm.

New York, N. Y.—The Foundation Co., of this place on May 10, removed its offices from the Woolworth Building to its own building at 120 Liberty St., New York.

Cleveland, Ohio — The manufacturing sales department of The Wellman-Seaver-Morgan Co., which handles the company's sales of rubber equipment and machinery and which is in charge of L. N. Ridenour, moved on March 31 from the company's Akron office to its general offices at 7000 Central Ave., Cleveland.

Chicago, Ill—The bill proposed by C. J. Thompson, representative in Congress, to tax advertising, was discussed at length by the members of the Engineering Advertisers' Association at its monthly meeting at the Great Northern Hotel, here, on April 13. It was unanimously agreed to enter a vigorous protest against this proposed legislation as being unsound and unfair to business. It was said that the passing of such a bill would tend to curtail the advertising of some manufacturers, which would cause more or less depression in business, and as the crying need of the hour is for more production, it would be unwise to interfere with business now by passing the proposed tax bill. The members of the Engineering Advertisers' Association represent about one hundred of the leading manufacturers of engineering products in the Middle West and their opinions on such an important subject should be seriously considered.

Reading, Pa.—The Reading Iron Co. has announced the purchase of two of the plants of the Susquehanna Iron Co., at Columbia, Pa. This is the third important acquisition in the policy of expansion adopted by the Reading company since L. E. Thomas assumed the presidency in March 1919. Through the acquisition of the Columbia and Susquehanna plants, the Reading Iron Co., will be enabled, in spite of its ever increasing production, to continue its practice of absolutely controlling the quality of all the material entering into its wrought iron pipe, the puddle bar and skelp capacity being never allowed to fall below the capacity of its tube works.

Coming Meetings

Mine Inspectors' Institute of America will hold its annual meeting **July 13, 14 and 15** at Cleveland, Ohio. Secretary, J. W. Paul, Pittsburgh, Pa.

Pennsylvania Retail Coal Merchants Association will hold its annual meeting June 23, 24 and 25 at Reading, Pa. Secretary, W. M. Bertolet, Reading, Pa.

The Rocky Mountain Coal Mining Institute will hold its annual meeting in Denver, Col., in conjunction with the National First Aid Meet on Aug. 20 and 21. Secretary, F. W. Whiteside, Denver, Col.

M. O. I. Coal Association will hold its annual convention June 16, 17 and 18 at Cedar Point, Ohio. Secretary, B. F. Nigh, Columbus, Ohio.

National Retail Coal Merchants' Association will hold its annual meeting June 10-12. Detroit, Mich. Secretary-manager, Ellery Gordon, Philadelphia, Pa.

Kentucky Mining Institute will hold its annual meeting June 4 and 5 at Lexington, Ky. Secretary, C. W. Strickland, Huntington, W. Va.

American Institute of Mining and Metallurgical Engineers will hold its fall meeting a little earlier this year, about Aug. 20. It is proposed to leave Buffalo by steamer and cruise through the Lakes, the first stop being at Houghton, Mich., after which the party will visit Duluth and the Iron Ranges of Minnesota, spending a day or two in Minneapolis on its return. Secretary, Bradley Stoughton, 29 West 39th St., New York City.

Southwestern Interstate Coal Operators' Association's annual meeting, June 8 at Kansas City, Mo. Secretary, A L. Johnson, Kansas City, Mo.

Illinois and Wisconsin Retail Coal Dealers' Association will hold its annual meeting Aug. 4 and 5 at Milwaukee, Wis. Secretary, I. L. Runyan, Chicago, Ill.

American Society of Mechanical Engineers will hold its spring meeting May 24, 25, 26 and 27 at St. Louis, Mo. Secretary, Calvin W. Rice, 29 West 39th St., New York City.

West Virginia Coal Mining Institute will hold its annual meeting June 7 and 8, at Frederick Hotel, Huntington, W. Va. Secretary, R. E. Sherwood, Chaarleston W. Va.

American Wholesale Coal Association will hold its annual meeting June 1 and 2 at Pittsburgh, Pa. Secretary, G. H. Merryweather, Washington, D. C.

The Colorado Retail Coal Dealers' Association will hold its annual meeting June 8, at Colorado Springs, Col. Secretary, E. Hopper, Denver, Col.

International Railway Fuel Association will hold its annual meeting May 24, 25, 26 and 27 at the Hotel Sherman, Chicago, Ill. Secretary, J. G. Crawford, Chicago, Ill.

American Institute of Electrical Engineers holds annual convention at White Sulphur Springs, W. Va., June 29 to July 2. Secretary, F. L. Hutchinson, New York, N. Y.

National Coal Association will hold its annual meeting May 25, 26 and 27 at the Traymore Hotel, Atlantic City, N. J. Secretary, W. B. Reed, Commercial Bank Building, Washington, D. C.

National Conference of Business Paper Editors will hold its next meeting June 4 at the Congress Hotel, Chicago, Ill. Secretary, R. Dawson Hall, 36th St. and 10th Ave., New York City.

Trade Catalogs

Portable Air Compressors. The Sullivan Machinery Co., Chicago, Ill. Bulletin 75 T. Pp. 8; 6 x 9 in.; illustrated. Description of gasoline-engine driven type. Class WK-31.

Centrifugal Pumps. The De Laval Steam Turbine Co., Trenton, N. J. Catalog B. Pp. 44; 8½ x 11 in.; illustrated. Description of centrifugal pumps of the single-stage and multi-stage types for various services.

Water, Plenty of It for Man and Beast. The Humphreys Manufacturing Co., Mansfield, Ohio. Bulletin. Pp. 28; 7½ x 10½ in.; illustrated. Description of methods and appliances for furnishing supply of water for various industries.

Publications Received

Seventh Annual Report of the State Inspector of Coal Mines. Colorado, 1919. Clothbound book. Not illustrated; 78 pp. 6 x 9¼ in. Practically all statistical data about the five state mining districts.

Approved Explosion-Proof Coal-Cutting Equipment. By L. C. Ilsley and E. J. Gleim. Department of the Interior. Bureau of Mines. Bulletin 78. Illustrated; pp. 53. 6 x 9 in. Report on work done by electrical section of Bureau of Mines at its Pittsburgh station.

Abstract of Current Decisions on Mines and Mining. By J. W. Thompson. Department of the Interior. Bureau of Mines. Bulletin 183. Law Serial 20. Not illustrated; pp. 167; 6 x 9 in. Reported May-August, 1919.

Obituary

Eugene H. Olds, aged 47, died at his home in Fort Wayne, Ind. He was president of the Olds Coal Co. and was also interested in other business enterprises of his home city.

Arthur Benedict Bellows, first vice-president of the Pittsburgh Testing Laboratory, died on April 17.

Guy M. Freer, the executive secretary of the National Industrial Traffic League, of Chicago, Ill., died of pneumonia, at his home in Chicago, after an illness of but 24 hours.

CURRENT PRICES—MATERIALS & SUPPLIES

IRON AND STEEL

PIG IRON—Quotations compiled by the Matthew Addy Company:

	Current	One Month Ago
CINCINNATI,		
No. 2 Southern	$45.60	$44.60
Northern Basic	42.80	42.80
Southern Ohio No. 2	46.80	43.80
NEW YORK, Tidewater delivery		
2X Virginia (silicon 2.25 to 2.75)	49.65	47.65
Southern No. 2 (silicon 2.25 to 2.75)	49.70	47.70
BIRMINGHAM		
No. 2 Foundry	42.00	41.00
PHILADELPHIA		
Eastern Pa., No. 2 x 2.25–2.75 sil	45.35–45.65*	45.35–46.35*
Virginia No. 2	43.25*	43.25*
Basic	44.50†	43.00†
Grey Forge	43.50*	42.50*
CHICAGO		
No. 2 Foundry Local	44.25	43.25
No. 2 Foundry Southern	47.00	46.60
PITTSBURGH, including freight charge from the Valley		
No. 2 Foundry Valley	45.65	43.65
Basic	44.40	42.90
Bessemer	44.90	43.40
MONTREAL		
Silicon 2.25 to 2.25%	43.25	43.25

* F. o. b. furnace. † Delivered.

STRUCTURAL MATERIAL—The following are the base prices, f.o.b. mill, Pittsburgh, together with the quotations per 100 lb. from warehouses at the places named:

	Mill	New York		St.	Chi-
	Pittsburgh	Current	One Year Ago	Louis	cago
Beams, 3 to 15 in	$2.45@$4	$3.97@$5	$3.47	$4.04	$3.97
Channels, 3 to 15 in	2.45@ 4	3.97@ 5	3.47	4.04	3.97
Angles, 3 to 6 in., ¼ in. thick	2.45@ 4	3.97@ 5	3.47	4.04	3.97
Tees, 3 in. and larger	2.45@ 4	4.02@ 5	3.52	4.04	4.02
Plates	2.65@ 4	4.17@ 5	3.47	4.24	4.17

BAR IRON—Prices in cents per pound at cities named are as follows:

Pittsburgh	Cincinnati	St. Louis	Birmingham
4.50	5@6	4.59	5.00

NAILS—Prices per keg from warehouse in cities named:

	Mill Pittsburgh	St. Louis	Chicago	Birmingham	San Francisco
Wire	$4.00	$4.50	$4.15	$5.75	$6.00
Cut		5.40	7.00	....	8.50

TRACK SUPPLIES—The following prices are base per 100 lb. f.o.b. Pittsburgh for carload lots, together with the warehouse prices at the places named:

	Pittsburgh	Chicago	St. Louis	San Francisco	Birmingham
Standard railroad spikes ⅝-in. and larger	$4.00	$3.62	$5.34	$5.65	$5.50
Track bolts	6@6.50	4.62 Prem.		6.65	7.50
Standard section angle bars	3@4	3.02 Prem.		4.90	....

COLD FINISHED STEEL—Warehouse prices are as follows:

	New York	Chicago	Cleveland	St. Louis
Round shafting or screw stock, per 100 lb. base	$6.25	$5.80	$6.00	$5.00
Flats, squares and hexagons, per 100 lb. base	6.75	6.30	5–6.50	5.50

HORSE AND MULE SHOES—Warehouse prices per 100 lb. in cities named:

	Mill Pittsburgh	Cincinnati	Chicago	St. Louis	Birmingham
Straight	$5.75	$7.50	$7.00	$7.25	$7.00
Assorted	5.85	7.50	7.15	7.50	7.25

Cincinnati—Horseshoe nails sell for $4.50 to $5 per 25-lb. box.

CAST-IRON PIPE—The following are prices per net ton for carload lots:

	New York						
	Current	One Month Ago	One Year Ago	Chicago	St. Louis	San Francisco	Dallas
4 in.	$79.30	$75.30	$60.70	$78.80	$78.00	$93.55	$74.30
6 in. and over	76.30	72.30	57.70	75.80	75.00	90.55	71.30

Gas pipe and 15-ft. lengths are $1 per ton extra.

STEEL RAILS—The following quotations are per ton f.o.b. Pittsburgh and Chicago for carload or larger lots. For less than carload lots 5c. per 100 lb. is charged extra:

	Pittsburgh		Chicago	
	Current	One Year Ago	Current	One Year Ago
Standard Bessemer rails	$45@60	$45.00	$45.00 @$55.00	$45.00
Standard openhearth rails	47@60	47.00	47.00 @ 57.00	47.00
Light rails, 8 to 10 lb.	2.585*@3.75	2.585*	2.585*@ 3.75*	2.835*
Light rails, 12 to 14 lb.	2.54* @3.75	2.54*	2.54* @ 3.75*	2.79*
Light rails, 25 to 45 lb.	2.45* @3.75	2.45*	2.45* @ 3.75*	2.70*

* Per 100 lb.

OLD MATERIAL—The prices following are per gross ton paid to dealers and producers in New York. In Chicago and St. Louis the quotations are per net ton and cover delivery at the buyer's works, including freight transfer charges:

	New York	Chicago	St. Louis
No. 1 railroad wrought	$29.00	$27.00	$29.00
Stove plate	29.00	30.00	32.50
No. 1 machinery cast	39.00	37.50	39.50
Machine shop turnings	15.50	12.50	15.50
Cast borings	16.00	14.25	16.50
Railroad malleable cast	27.50	28.00	28.50
Rerolling rails	29.00	32@33	31.50@32
Relaying rails	.....	40@50	50@55

COAL BIT STEEL—Warehouse price per pound is as follows:

New York	Cincinnati	Birmingham	St. Louis	Chicago
$0.10	$0.16½	$0.18	$0.11	$0.15

DRILL STEEL—Warehouse price per pound:

	New York	St. Louis	Birmingham
Solid	14c.	13c.	15c.
Hollow	16c.	....	....

PIPE—The following discounts are to jobbers for carload lots on the Pittsburgh basing card, discounts on steel pipe, applying as from January 14, 1920, and on iron pipe from January 7, 1920:

BUTT WELD

Inches	Steel Black	Steel Galv.	Inches	Iron Black	Iron Galv.
⅛, ¼ and ⅜	47	20½	¼ to 1½	34½	18½
½	51	36½			
¾ to 3	54	41½			

LAP WELD

2	47	34½	2	28½	14½
2½ to 6	50	37½	2½ to 6	30½	17½

BUTT WELD, EXTRA STRONG PLAIN ENDS

⅛, ¼ and ⅜	43	25½	¼ to 1½	34½	19½
½	48	35½			
¾ to 1½	52	39½			

LAP WELD, EXTRA STRONG PLAIN ENDS

2	45	33½	2	29½	16½
2½ to 4	48	36½	2½ to 4	31½	19½
4½ to 6	47	35½	4½ to 6	30½	18½

Stocks discounts in cities named are as follows:

	New York		Cleveland		Chicago	
	Black	Galvanized	Black	Galvanized	Black	Galvanized
⅛ to 3 in. steel butt welded	40%	24%	40%	31%	54%	40½%
3½ to 3 in. steel lap welded	35%	20%	42%	27%	50%	37½%

Malleable fittings. Class B and C, from New York stock sell at list + 23%.
Cast iron, standard sizes, net.

WIRE ROPE—Discounts from list price on regular grades of bright and galvanized are as follows:

	New York and St. Louis
Hercules red stand, all constructions	20%
Patent flattened strand, special and cast steel	20%
Patent flattened strand, iron rope	5%
Plow steel round strand rope	30%
Special steel round strand rope	30%
Cast steel round strand rope	22½%
Iron strand and iron tiller	5%
Galvanized iron rigging and guy rope	+12%

San Francisco: Galvanized, less 5%, bright less 25%.
Chicago, +12½ on galvanized, 30 off on bright.

SHEETS—Quotations are in cents per pound in various cities from warehouse; also the base quotations from mill:

	Large Mill Lots	St.	San Fran-	New York	
Blue Annealed	Pittsburgh	Louis	Chicago	cisco	Current	One Yr. Ago
No. 10	$3.55@$6.00	$7.09	$7.02	$7.50	$6.62@$8.00	$4.57
No. 12	3.60@ 6.05	7.09	7.07	7.55	6.67@ 8.05	4.62
No. 14	3.65@ 6.10	7.09	7.12	7.60	6.22@ 8.10	4.67
No. 16	3.75@ 6.20	7.09	7.17	7.70	6.82@ 8.20	4.77
Black:						
*Nos. 18 and 20	4.15@ 6.30	8.10	7.80	7.85	7.80@ 8.80	5.42
*Nos. 22 and 24	4.20@ 6.35	8.10	7.85	7.90	7.85@ 8.85	5.47
*No. 26	4.25@ 6.40	8.10	7.90	7.95	7.90@ 8.90	5.52
*No. 28	4.35@ 6.50	8.10	8.00	8.05	8.00@ 9.00	5.62
Galvanized:						
No. 10	5.80@ 7.50	9.60	8.50	8.60	8.25@10.00	5.97
No. 12	4.80@ 7.60	9.60	8.60	8.60	8.35@10.10	6.02
No. 14	4.80@ 9.60	9.60	8.60	8.60	8.35@10.10	6.07
Nos. 18 and 20	5.10@ 7.90	9.60	8.90	8.90	8.65@10.40	6.37
Nos. 22 and 24	5.25@ 8.05	9.60	9.05	9.05	8.80@10.55	6.52
*No. 26	5.40@ 8.20	9.60	9.20	9.20	8.95@10.70	6.62
*No. 28	5.70@ 8.50	9.60	9.50	9.50	9.25@11.00	6.97

* For painted corrugated sheets add 30c. per 1,000 lb. for 5 to 28 gage; 25c. for 19 to 24 gages; for galvanized corrugated sheets add 15c; all gages.

SHOP SUPPLIES

NUTS—From warehouse at the places named, on fair size orders, the following amount is deducted from list:

	New York	Cleveland		Chicago		St. Louis
	Current	Current	One Year Ago	Current	One Year Ago	Current
Hot pressed square	+$4.00	$ .75	$1.90	$ .50	$1.28	$2.25
Hot pressed hexagon	+ 4.00	.75	1.90	.50	1.08	2.25
Cold punched square	+ 4.00	.75	1.90	.50	1.30	2.25
Cold punched hexagon	+ 4.00	.75	1.90	.50	1.30	2.25

Semi-finished nuts, $\frac{7}{8}$ and smaller, sell at the following discounts from list price:

	Current	One Year Ago
New York	30%	50–1 %
Chicago	50%	50%
Cleveland	50%	50–10%
St. Louis	45%	....

MACHINE BOLTS—Warehouse discounts in the following cities:

	New York	Cleveland	Chicago	St. Louis
½ by 4 in. and smaller	list	40%	30%	50–5%
Larger and longer up to 1 in. by 30 in.	+20%	20–10%	20%	40–5%

WASHERS—From warehouses at the places named the following amount is deducted from list price:

For wrought-iron washers:
New York....list Cleveland.....$3.00 Chicago.....$3.00

For cast-iron washers the base price per 100 lb. is as follows:
New York..... $7.00 Cleveland.....$4.50 Chicago.....$4.25

RIVETS—The following quotations are allowed for fair sized orders from warehouse:

	New York	Cleveland	Chicago
Steel $\frac{7}{16}$ and smaller	30%	40% off	35–10%
Tinned	30%	40% off	35–10%

Boiler, ½, ¾, 1 in. diameter by 2 in. to 5 in. sell as follows per 100 lb.:
New York..$7.00 base Cleveland..$4.00 Chicago..$5.37 Pittsburgh..$4.72

Structural, same sizes:
New York..$7.10 Cleveland..$4.10 Chicago..$5.47 Pittsburgh..$4.82

CONSTRUCTION MATERIALS

LINSEED OIL—These prices are per gallon:

	New York Current	New York One Year Ago	Cleveland Current	Cleveland One Year Ago	Chicago Current	Chicago One Year Ago
Raw, 5-bbl. lots	$1.87	$1.59	$2.00	$2.30	$2.05	$1.78
5-gal. cans	1.87*	1.72	2.25	2.45	2.30	1.98

*To this *oil* price must be added the cost of the cans (returnable), which is $2 25 for a case of six.

WHITE AND RED LEAD—Base price.

	Red Current		Red 1 Year Ago		White Current	White 1 Year Ago
	Dry	In Oil	Dry	In Oil	Dry and In Oil	Dry and In Oil
100-lb. keg	15.50	17.00	13.00	14.50	15.50	13.00
25 and 50-lb. kegs	15.75	17.25	13.25	14.75	15.75	13.25
12½-lb. keg	16.00	17.50	13.50	15.00	16.00	15.50
5-lb. cans	18.50	20.00	15.00	16.50	18.50	15.00
1-lb. cans	20.50	22.00	16.00	17.50	20.50	16.00

500 lb. lots less 10% discount. 2000 lb. lots less 10–2½% discount.

COMMON BRICK—The prices per 1000 in cargo or carload lots are as follows:

Chicago.....$14.00 Cincinnati.....$24.00
St. Louis, salmon..... 16.00 Birmingham..... 15.00

PREPARED ROOFINGS—Standard grade rubbered surface, complete with nails and cement, costs per square as follows at manufacturing points:

	1-Ply c.l.	2-Ply l.c.l.	3-Ply c.l.
No. 1 grade	$2 40	$2.90	$3.45
No. 2 grade	2.15	2.00	3.10

Slate-surfaced roofing (red and green) in rolls of 108 sq. ft. costs $3.50 per roll in carload lots and $3.75 fo. smaller quantities.

Shingles, red and green slate finish, cost $7.75 per square in carloads; $8.00 in smaller quantities, in Phi adelphia.

ROOFING MATERIALS—Prices per ton f.o.b. New York and Chicago:

Tar felt (14 lb. per square of 100 sq.ft.) per roll	$3.50
Tar pitch (in 400-lb. bbl.) per 100 lb	1.85
Asphalt pitch (in barrels) per ton	46.50
Asphalt felt (light) per ton	118.00
Asphalt felt (heavy) per ton	119.50

HOLLOW TILE—Price per block in carload lots for hollow building tile:

	4x12x12	8x12x12	12x12x12
Minneapolis	$0.087	$0.158	$0.248
St. Louis		none on market	
Seattle	.09	.175	.30
New Orleans	.198	.264	.37
Chicago	.132	.2387	.3581
Cincinnati	.125	.2186	.3286
Birmingham	.122	.224	.....

LUMBER—Price of pine per M in carload lots:

	1-In. Rough 10 In. x 16 Ft.	2-In. T. and G. 10 In. x 16 Ft.	8 x 8 In. x 20 Ft.
St. Louis	$53.00	$46.00	$42.00
Birmingham	63.00	70.00	58.00
Cincinnati	55.00	50.00	50.00

EXPLOSIVES—Price per pound of dynamite in small lots and price per 25-lb. keg for black powder:

	Low Freezing 20%	Gelatin 40%	Gelatin 60%	Gelatin 80%	Black Powder
New York	....	$0.3425	$0.3425	.....	$2.30
Boston	$0.2475	.27	.30	$0.3425	2.45
Kansas City	.235	.26	.385	.3275	2.40
New Orleans	.2375 (50%)	.2275	.2475	....	.....
Seattle	.18	.2175	.2475	.29	2.45
Chicago	.2175	.2525	.2975	.34	2.45
St. Paul	.185	.2275	.2525	....	2.25
St. Louis	.2175	.26	.285	.295	1.90
Los Angeles	.25	.30	.35	.275	2.95

MISCELLANEOUS

GREASES—Prices are as follows in the following cities in cents per pound for barrel lots:

	Cincinnati	St. Louis	Birmingham
Cup	8.5	3.7 3.8	8.5
Fiber or sponge	9	7.2	8.5
Transmission	10	14	8.5
Axle	5	5	4.5
Gear	6.5	6.5	8.5
Car journal	12.0	4.7	8.5

BABBITT METAL—Warehouse prices in cents per pound:

	New York Current	New York One Year Ago	Cleveland Current	Cleveland One Year Ago	Chicago Current	Chicago One Year Ago
Best grade	90.00	87.00	74.50	79.00	70.00	75.00
Commercial	50.00	42.00	21.50	18.50	15.00	15.00

HOSE—Following are prices of various classes of hose:

Fire

	50-Ft. Lengths
Underwriters' 2½-in.	78c. per ft.
Common, 2½-in.	35%

Air

	First Grade	Second Grade	Third Grade
¾-in. per ft	$0.55	$0.35	$0.25

Steam—Discounts from list

First grade	25%	Second grade	35% Third grade 40%

LEATHER BELTING—Present discounts from list in cities named:

	Medium Grade	Heavy Grade
New York	20%	10–5%
St. Louis	40%	35%
Birmingham	35%	30%
Chicago	45%	40%
Cincinnati	30–5–2½%	40–2½%

RAWHIDE LACING—For cut, best grade, 25%, 2nd grade, 30%. For laces in sides, best, 81c.

PACKING—Prices per pound:

Rubber and duck for low-pressure steam	$1.00
Asbestos for high-pressure steam	1.70
Duck and rubber for piston packing	1.00
Flax, regular	1.20
Flax, waterproofed	1.70
Compressed asbestos sheet	.90
Wire insertion asbestos sheet	1.50
Rubber sheet	50
Rubber sheet, wire insertion	.70
Rubber sheet, duck insertion	.50
Rubber sheet, cloth insertion	.30
Asbestos packing, twisted or braided, and graphited, for valve stems and stuffing boxes	1.30
Asbestos wick, ½- and 1-lb. balls	.85

MANILA ROPE—For rope smaller than ¾-in. the price is ½ to 2c. extra; while for quantities amounting to less than 600 ft. there is an extra charge of 1c. The number of feet per pound for the various sizes is as follows: ¼-in., 8 ft.; ½-in., 6; ¾-in., 4½; 1 in., 3½; 1¼-in., 2 ft. 10 in.; 1½-in., 2 ft. 4 in. Following is price per pound for ¾-in. and larger, in 1200-ft. coils:

Boston	$0.35	Birmingham	$0.32
New York	.29	Atlanta	.295
St. Louis	.265	Kansas City	.30½
Chicago	.275	New Orleans	.31
Minneapolis	.275	Seattle	.28
San Francisco	.27	Los Angeles	.31

PIPE AND BOILER COVERING—Below are discounts and part of standard lists:

PIPE COVERING Pipe Size	Standard List Per Lin.Ft.	BLOCKS AND SHEETS Thickness	Price per Sq.Ft.
1-in.	$0.27	½-in.	$0.27
2-in.	.36	1 -in.	.30
3-in.	.45	1½-in.	.45
4-in.	.60	2 -in.	.60
6-in.	.80	2½-in.	.75
8-in.	1.10	3 -in.	.90
10-in.	1.30	3½-in.	1.05

85% magnesia high pressure: List

For low-pressure heating and return lines: 4-ply.... 40% off; 3-ply.... 42% off; 2-ply.... 44% off

WIRING SUPPLIES—New York prices for tape and solder are as follows:

Friction tape, ½-lb. rolls	55c. per lb.
Rubber tape, ½-lb. rolls	60c. per lb.
Wire solder, 50-lb. spools	46c. per lb.
Soldering paste, 2-oz. cans	$1.20 per doz.

COPPER WIRE—Prices per 1000 ft. for rubber-covered wire in following cities:

	New York Single Braid, Solid	New York Double Braid, Stranded	New York Double Braid, Duplex	Birmingham Single Braid, Solid	Birmingham Double Braid, Stranded	Birmingham Double Braid, Duplex	Cincinnati Single Braid, Solid	Cincinnati Double Braid, Stranded	Cincinnati Double Braid, Duple
14	$12.00	$13.90	$28.50	$12.23	.....	$33.60	$12.00	$14.66	$29.07
10	18.30	23.85	41.50	24.00	.....	57.02	21.11	24.98	49.58
8	25.54	32.70	56.70	33.60	.....	75.94	30.83	35.33	.....
6	.....	51.40	.....	94.41	.....	.....	.....	54.27	.....
4	.....	70.00	.....	.....	93.41	.....	.....	76.19	.....
2	.....	101.80	.....	.....	120.40	.....	.....	109.60	.....
1	.....	131.86	.....	.....	155.23	.....	.....	141.20	.....
0	.....	160.00	.....	.....	188.77	.....	.....	171.20	.....
00	.....	193.50	.....	.....	229.19	.....	.....	207.60	.....
000	.....	235.20	.....	.....	278.64	.....	.....	257.40	.....
0000	.....	288.60	.....	.....	338.41	.....	.....	306.80	.....

FREIGHT RATES—On finished steel products in the Pittsburgh district including plates, structural shapes, merchant steel, bars, pipe fittings, plain and galvanized wire nails, rivets, spikes, flat sheets (except planished), chains, etc., the following freight rates per 1000 lb. are effective:

Boston	$0.30	New Orleans	$0.385
Buffalo	0.17	New York	0.27
Chicago	0.27	Philadelphia	0.245
Cincinnati	0.23	St. Louis	0.24
Cleveland	0.17	St. Paul	0.495
Kansas City	0.59	Pacific Coast (all rail)	1.25*

Note—Add 3% transportation tax. *Minimum carload, 80,000 lb.